User Manual

SG3KTL-EC / SG4KTL-EC/

SG5KTL-EC / SG6KTL-EC

PV Grid-Connected Inverter

SG3_4_5_6KTL-EC-UEN-Ver13-201409 Version：1.3

About This Manual

This manual is for the inverters SG3KTL-EC, SG4KTL-EC, SG5KTL-EC, and SG6KTL-EC (hereinafter referred to as inverter unless specified otherwise). They are grid-connected, transformer-less, robust inverters with high conversion efficiency. The devices will bring you profit for PV power system.

Aim

The manual contains information about the inverter, which will provide you guidelines to connect the inverter into the PV power system and to operate the inverter.

Related Documents

The manual cannot include complete information about the PV system. You will get the additional information about other devices at www.sungrowpower.com or via the webpage of device manufacturer.

Target Group

The manual is targeted to technical personnel who is responsible for inverter installation and commissioning in the PV power system and inverter owner who will perform daily LCD operation.

How to Use This Manual

Read the manual and other related documents before any work on the inverter. Documents must be stored carefully and available at all times.

The contents of the manual will be periodically updated or revised due to product development. It is probably that there are changes of manual in subsequent inverter edition. The latest manual can be acquired via www.sungrowpower.com.

Symbols Explanation

Important instructions contained in this manual should be followed during installation, operation and maintenance of the inverter. And they will be highlighted by the following symbols.

DANGER

DANGER indicates a hazard with a high level of risk which, if not avoided, will result in death or serious injury.

WARNING

WARNING indicates a hazard with a medium level of risk which, if not avoided, could result in death or serious injury.

CAUTION

CAUTION indicates a hazard with a low level of risk which, if not avoided, could result in minor or moderate injury.

NOTICE

NOTICE indicates a situation which, if not avoided, could result in equipment or property damage.

NOTE indicates additional information, emphasized contents or tips to help you solve problems or save time.

Symbols on the Inverter Body

	Disconnect the inverter from mains and PV generator before service!
	Do not touch any inner live parts until 10 minutes after disconnection from the utility grid and the PV input.
	Hot surface! In order to reduce the risk of burns, do not touch the hot surface when the device is running.
	Look over the user manual before any operation on the inverter!
	The installation and service of the inverter unit can be performed only by qualified personnel.

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1 Safety Instructions

IMPORTANT SAFETY INSTRUCTIONS

The inverters have been designed and tested strictly according to the international safety regulations. As electrical and electronic equipments, safety instructions related to them must be complied with during installation, commissioning, operation and maintenance. Incorrect operation or work may result in damage to

- the life and well-being of the operator or a third party, or
- the inverter and other properties that belong to the operator or a third party.

Therefore, the following general safety instructions must be read and always kept in mind prior to any work. All detailed work-related safety warnings and notes will be specified at the critical points in corresponding chapter.

⚠ WARNING

All installation and electrical work must be performed only by qualified personnel. They have

- **been trained specially;**
- **already read through and understood the manual and other related documents;**
- **been familiar with safety requirements for electrical system.**

Technical personnel mentioned above may perform the following work:

- Install the inverter onto the wall.
- Connect the inverter into the PV power system.
- Connect other devices into the PV power system.
- Commission the inverter.
- Maintain and service the inverter.

Before Installation

CAUTION

There is a risk of injury due to improperly handling the device!

- **Always follow the instructions contained in the manual when moving and positioning the inverter.**
- **The weight of the equipment can cause injuries, serious wounds, or bruise if improperly handled.**

NOTICE

The device is thoroughly tested and strictly inspected before delivery. Damage may still occur during shipping.

If there is visible damage to the packaging or the inner contents, or anything missing, contact the device dealer.

During Installation

DANGER

Prior to installing the inverter onto the wall, it is crucial to make certain that the inverter is not electrically connected.

CAUTION

System performance loss due to bad ventilation!

The device requires good ventilation during operation. It is essential to keep the device upright and nothing covering the heat sink to ensure that the device interior is well cooled down.

During Electrical Connection

NOTICE

All electrical connections must be in accordance with local and national standards.

Only with the permission of the local energy sector, the inverter can be connected into the utility grid.

DANGER

Lethal voltage!

PV arrays will produce electrical energy when exposed to sunlight and thus can create an electrical shock hazard.

- **Wiring of the PV arrays should be performed only by qualified personnel.**
- **PV modules should be covered by opaque materials during wiring.**

WARNING

All cables must be firmly attached, undamaged, properly insulated and adequately dimensioned.

During Inverter Operation

Do not open the enclosure when the inverter is under voltage. There is a highly unlikely risk of explosion in very specific cases of fault. The enclosure will protect persons and property from such an explosion, only if it is correctly sealed.

DANGER

There is a risk of inverter damage or personal injury!

DO NOT disconnect DC connectors while the inverter is under AC load! First de-energize the device from dual power sources and then verify that there is no voltage present.

CAUTION

There is a risk of burn!

DO NOT touch the device hot parts (such as heat sink) during operation. Only LCD display panel and DC switch can be touched during inverter operation.

Maintenance and Service

DANGER

Always keep in mind that the inverter is power supplied by dual power sources: PV arrays and utility grid.

There is a risk of inverter damage or personal injury due to incorrect service work!

Before any service work, you should obey the following procedures.

- **Disconnect the inverter from the utility grid first and then PV arrays;**
- **Wait at least 10 minutes until the inner capacitors discharge completely;**
- **Verify that no voltage and current is present with appropriate testing device.**

CAUTION

Keep non-related persons away!

A temporary warning sign and barrier must be posted to keep non-related persons away in any period while performing electrical connection and service work.

NOTICE

- **Any fault that may impair the inverter safety functions must be repaired immediately before the inverter is restarted.**
- **Inverter contains no owner serviceable parts inside. Please contact local authorized personnel if any service work is required.**

Servicing of the device in accordance with the manual should never be undertaken in the absence of proper tools, test equipments or more recent revision of the manual which is clearly and thoroughly understood.

NOTICE

There is a risk of inverter damage if it is improperly serviced.

Use only accessories and spare parts approved by the inverter manufacturer. Never modify the inverter or its components. Otherwise, it will cause loss of any or all warranty rights.

NOTICE

There is a risk of inverter damage due to electrostatic discharge!

The printed circuit boards contain components sensitive to electrostatic discharge. Wear a grounding wrist band when handling the boards. Avoid unnecessary touch with the boards during replacement.

Others

NOTICE

The selected country settings can be changed only by service personnel!

Unauthorized alternation of the country settings is prohibited. Otherwise it may cause a breach of the type-certificate marking.

⚠ WARNING

All safety instructions, warning labels and nameplate on the inverter body:

- **Must be clearly visible;**
- **Must not be removed, covered or pasted.**

NOTICE

These regulations should also be followed:

- **The regulations related to the electricity fed into grid;**
- **The safety instructions related to the PV arrays;**
- **The safety instructions related to other electrical devices.**

2 Product Introduction

2.1 Intended Usage

The inverters, which are 3-phase string inverters without transformer, are crucial units between the PV strings and utility grid in the small-scaled PV power system.

Inverter is dedicated to converting the DC power generated by the PV modules into AC power, which conforms to the parameters of local utility grid, and feeds the alternating current into the utility grid. The intended usage of the inverter is illustrated in Fig. 2-1.

NOTICE

Any other or additional usage is not permitted except the intended usage.

Neither the DC positive pole nor the DC negative pole of the PV strings is permitted to be grounded.

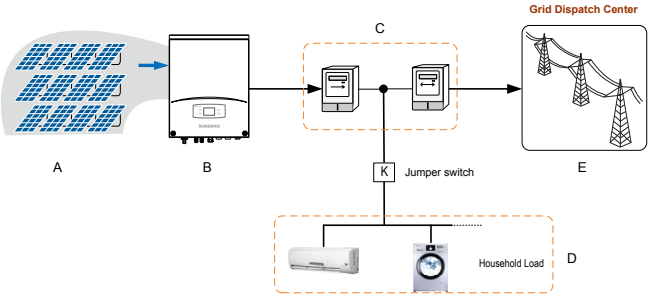


Fig. 2-1 Inverter Application in the PV Power System

Item	Description	Remark
A	PV strings	Monocrystalline silicon, polycrystalline silicon, and thin-film of protection class II without grounding
B	Inverter	SG3KTL-EC, SG4KTL-EC, SG5KTL-EC and SG6KTL-EC
C	Metering device	Meter cupboard with power distribution system
D	Household load	Household appliances
E	Utility grid	TT, TN-C, TN-S, TN-C-S

2.2 Product Description

2.2.1 Inverter Appearance

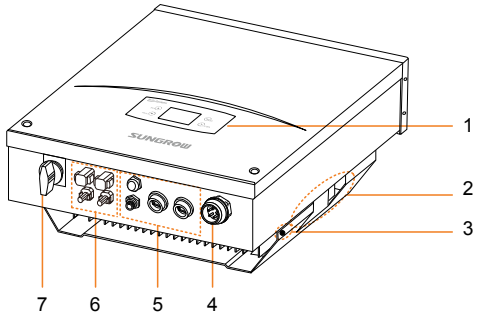


Fig. 2-2 Inverter Appearance

No.	Name	Description
1	LCD display panel	Human-computer interaction interface for looking up running information and configuring parameters.
2	Side grips	The side grips are designed for holding the unit when mounting, moving or servicing the inverter.
3	Second PE terminal	As specified in EN 50178.
4	AC connection terminal	Inverter feeds power to utility grid via this terminal.
5	Communication connection terminals	They are RS485 terminal, WiFi terminal, NET terminal and DI terminal.
6	DC terminals	There are two pairs of DC terminals for PV input on the bottom of the inverter.
7	DC switch	During normal operation it is in “ON” state. It can shut down the inverter in “OFF” position.

2.2.2 Inverter Dimensions

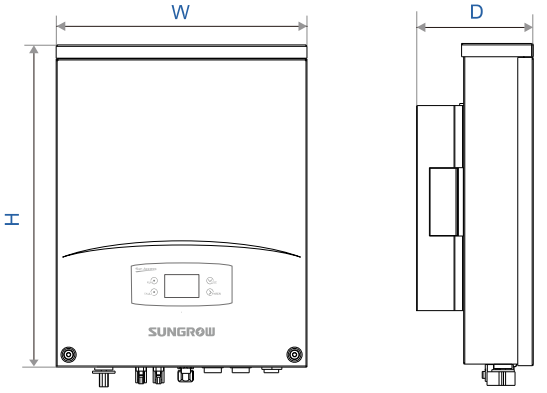


Fig. 2-3 Outline Dimensions

Tab. 2-1 Dimension Values

Type	W(mm)	H(mm)	D(mm)	Net weight(kg)
SG3KTL-EC	403	518	190	22
SG4KTL-EC	403	518	190	22
SG5KTL-EC	403	518	190	22
SG6KTL-EC	403	518	190	22

2.2.3 LCD Display Panel

As a human-computer interaction interface, LCD display panel is on the front panel and comprises LED indicators, buttons and LCD screen.

- LED indicators indicate the working status of the inverter.
- By pressing the buttons user can look up information and configure parameters.
- LCD screen shows the current running information.

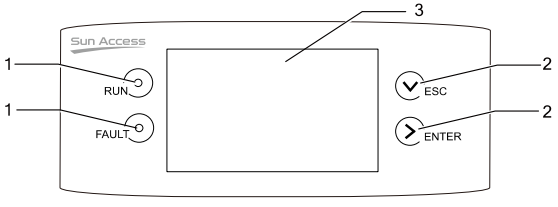


Fig. 2-4 LCD Display Panel

No.	Name	Description
1	LED indicators	"RUN" and "FAULT". The current running state can be known from the two indicators. Detailed definition is shown in Tab. 2-2.
2	Buttons	User can operate the LCD menu via the two buttons. Detailed function is shown in Tab. 10-1.
3	LCD Screen	LCD screen can display the current state, current running information, historical information, and parameters to be set.

Tab. 2-2 Description of LED Indicators

Name	State	Description
"RUN"	On	The inverter is feeding power to the utility grid or in derating operation.
	Blinking	The inverter is in the process of startup.
	Off	Other states.
"FAULT"	On	Communication error, permanent fault, or upgrade failure.
	Blinking	Other faults (alarms excluded).
	Off	No fault occurs.

2.3 Technical Description

2.3.1 Circuit Description

Fig. 2-5 shows the main circuit of the inverter.

The boost circuits raise the input DC voltage. Two string MPP trackers can be utilized to ensure the maximum power from PV arrays. Then the inverter circuit converts DC power to AC power. Three-level inverter circuit converts the DC power into AC power, which will be fed into the utility grid via AC terminal. Meanwhile inverter is equipped with protective circuit to guarantee its safety operation which can trigger the AC relay if required.

Additionally, a DC switch is integrated for safe disconnection of DC current. The inverter provides RS485 port, WiFi terminal, and NET port for communication. Users can look up running information and set parameters through LCD display panel.

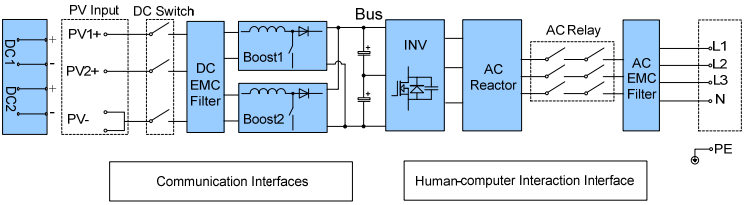


Fig. 2-5 Main Circuit Diagram of inverter

2.3.2 Functions Description

Inverter functions can be grouped as the following:

- Conversion function

  Inverter converts the DC power into AC power, which conforms to the grid requirements of its installation country.

- Parameters configuration

  Inverter provides various parameters configuration for optimal operation.

- Communication interfaces

  RS485 serial communication with RJ45 port (RS485), WiFi connection terminal, and Ethernet communication with RJ45 port (NET).

- Protection functions include:
  - Reverse polarity protection
  - Short circuit protection
  - Insulation resistance detection
  - Inverter output voltage monitoring
  - Inverter output frequency monitoring
  - Residual current monitoring
  - DC injection of AC output current surveillance
  - Anti-islanding protection
  - DC over-voltage protection
  - DC Over-current protection
  - Power module over-temperature protection

3 Unpacking and Storing

3.1 Unpacking and Inspecting

The device is thoroughly tested and inspected before delivery. Although sturdy packaging is used, damage may still occur during shipping.

If there is visible damage to the packaging or the inner contents, or anything missing, contact the device dealer.

Do not dispose of the original packaging. It is the best choice to store the inverter in the original packaging.

During unpacking, cut green plastic straps and lift full upper-part of the carton box. Do not cut the sticky tape.

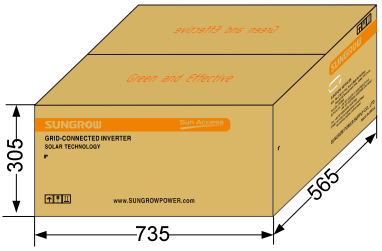


Fig. 3-1 Single Inverter in Original Packaging Carton(unit: mm)

3.2 Moving the Inverter

In order to avoid damage to the inverter during moving, it is better to move inverter in the original carton.

Pay attention to the weight. Proper device that can bear the weight is needed to avoid inverter damage or person injury when moving.

NOTICE

When moving the inverter, please follow the symbol instructions on the packaging box.

3.3 Identifying the Inverter

Two nameplates are attached to the side of the inverter and the carton respectively. They provide information about the inverter type, the most important specifications, marks of certification institutions, website and serial number which are available and identified by SUNGROW.

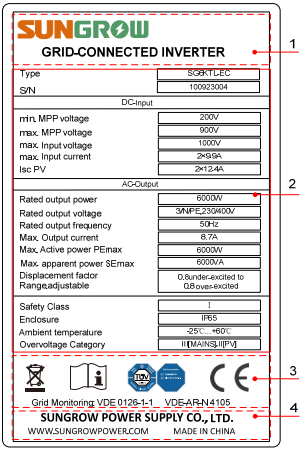


Fig. 3-2 Nameplate of Inverter

*Image shown here is for reference only. Actual product you receive may differ.

Item	Description	Item	Description
1	SUNGROW logo and product type	3	Marks of certification institutions
2	Technical data	4	Company name, website and origin

Tab. 3-1 Description of Icons on the Nameplate

Icon	Description
	Do not dispose of the inverter with the household waste.
	Refer to the corresponding instructions.
	TUV mark of conformity. The inverter is in compliance with directives of TUV.
	CE mark of conformity. The inverter is in compliance with directives of CE.

3.4 Delivery Contents

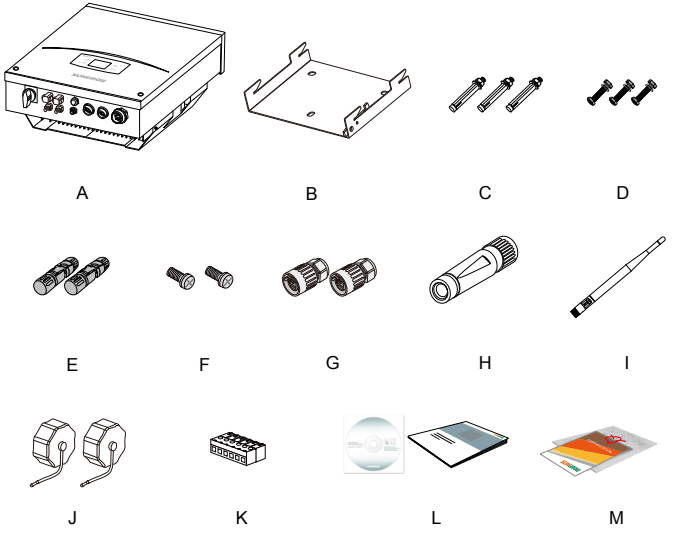


Fig. 3-3 Delivery Contents

*Image shown here is for reference only. Actual product you receive may differ.

Item	Description
A	Inverter.
B	Wall bracket used to mount inverter onto the wall.
C	Expansion bolts for fastening wall bracket onto concrete wall.
D	Fastener set for installing wall bracket onto metal frame.
E	PV input connectors, including positive and negative connectors.
F	Two M4x12 mm screws for second PE connection.
G	Waterproof communication connectors.
H	AC connector.
I	WiFi antenna.
J	Dust covers for the waterproof communication connectors.
K	Six-pole plug.
L	Quick User Manual and 1 CD containing User Manual and other documents.
M	Quality certificates, packing list and product test reports.

3.5 Storing the Inverter

If you do not install the inverter immediately, choose an appropriate location to store it.

- The device must be stored in original packaging and the desiccant must be left in the packaging.
- The device must be stored in a clean and dry place to protect against dust and moisture.
- The storage temperature should be always between -30°C and +70°C. . And the storage relative humidity should be always between 0 and 95%.
- It is very important to keep the packing away from chemicals. Otherwise it will lead to corrosion.
- During the storage time, check periodically for visible damages by rodents. Replace the packaging if necessary.
- If there is more than one inverter to be stored, the maximum layers for original paper packaging are three.
- After long-term storage, local installer or Service Dept. of SUNGROW should perform a comprehensive test before connecting the inverter into PV power system.

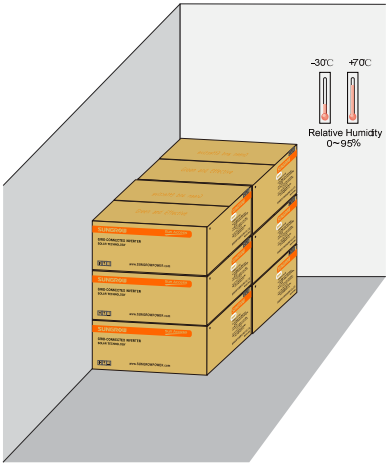


Fig. 3-4 Example for Inverter Storage

4 Securing Inverter to the Wall

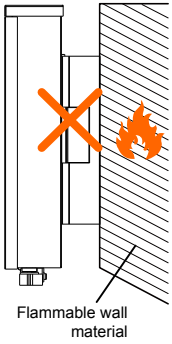
4.1 Selecting Installation Location

Selecting an optimal installation location for the inverter is decisive for its operating safety as well as its expected efficiency and service life.

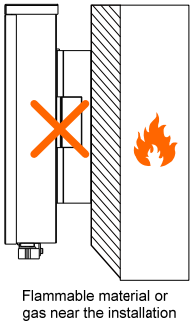
1. Take the load capacity of the wall into account. The wall (such as concrete wall and metal structure) should be strong enough to hold the weight of the inverter over a long period.

2. Install the device where is accessible to installing, electrical connection or service.

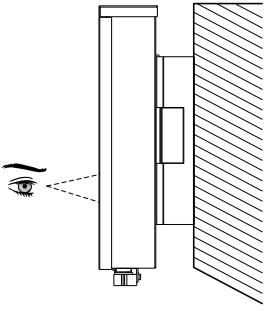
3. Do not install the device on wall of flammable materials.



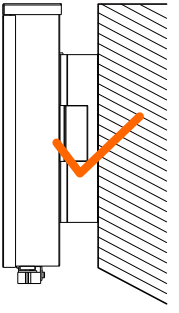
4. Do not install the device where contains flammable materials or flammable gas in the vicinity of the location.



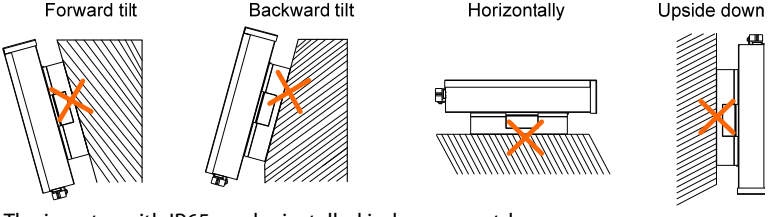
5. Install the device at eye level for easy buttons operation and display reading.



6. It is suggested that the inverter be installed vertically with upside up for good heat dissipation.



7. Never install the inverter horizontally, or with a forward tilt or with a backward tilt or even with upside down.



8. The inverter with IP65 can be installed indoors or outdoors.

9. The ambient temperature should range from -25°C to 60°C. The power output will reduce when the ambient temperature exceeds 45°C.

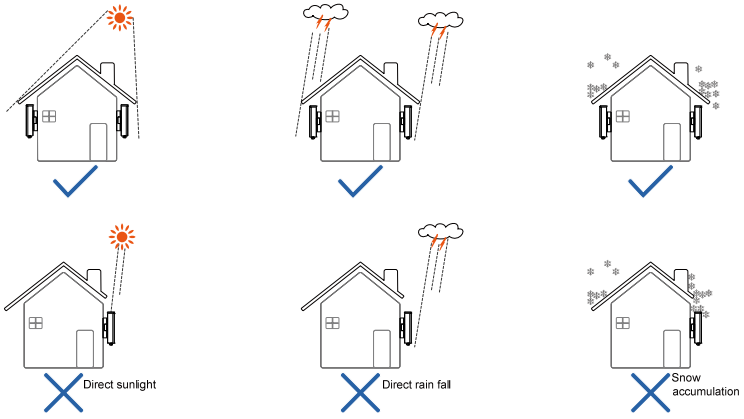
10. The maximum relative humidity of chosen installation site can reach 95%.

Max. ambient temperature:
+60°C

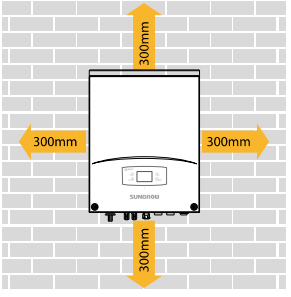
Min. ambient temperature:
-25°C

Max. relative humidity:
+95% No condensing

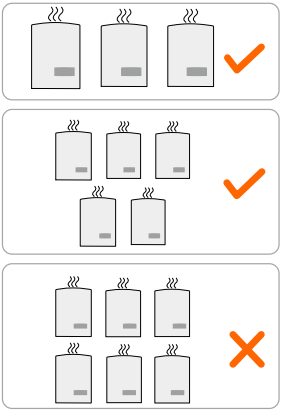
11. Avoid exposing the inverter to direct sunlight, rain or snow to extend its service life despite of IP65 rating. Shaded site of the building would be better.



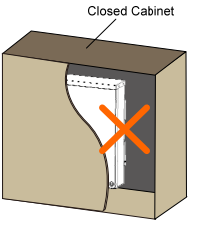
12. Take enough space for convection into consideration during installation.



13. For multiple inverters installation, position the inverters side by side. For multi-row inverters installation, position the inverters in a staggered arrangement.



14. Do not install the inverter in a enclosed cabinet. Otherwise, the inverter will not operate normally.



15. Do not install inverter where children can reach.

16. Do not install the inverter in residential area. Noise can be produced during the inverter running and may affect your daily life.

4.2 Moving Inverter to Installation Site

If the inverter is to be installed, remove the device from the packaging and move it to the chosen installation site. During the moving process, the instructions below should be obeyed.

1. Beware of the weight of the inverter.
2. Grasp the equipment with both hands by means of the side grips.
3. Move the inverter with the help of another person or with the lifting device.
4. Do not release the device unless it has been firmly secured to the wall.

4.3 Installing the Inverter

Inverter is installed onto the wall by means of wall bracket in the packaging.

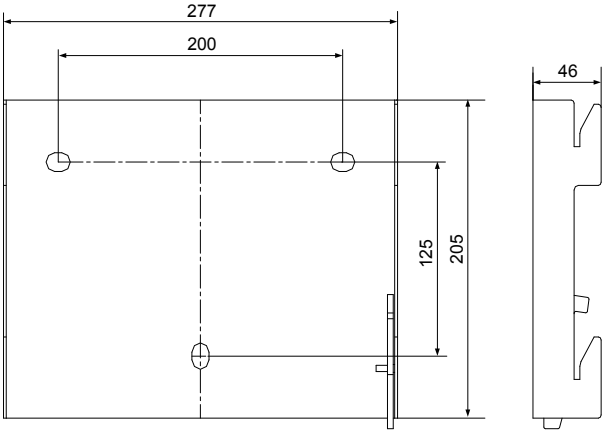


Fig. 4-1 Dimensions of wall bracket(unit: mm)

There are two sets of stainless fasteners supplied to attach the wall bracket to the concrete wall and metal frame respectively.

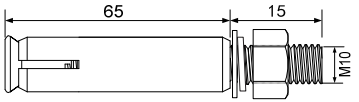


Fig. 4-2 Dimensions of Expansion Bolt Set for Concrete Wall(unit: mm)

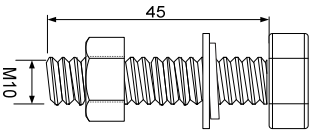


Fig. 4-3 Dimensions of Fastener Set for Metal Frame(unit: mm)

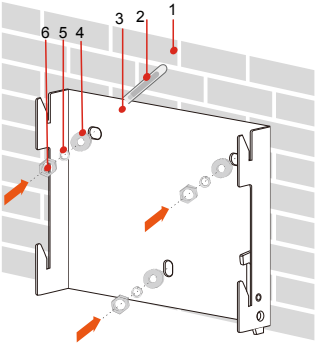
On Concrete Wall

1. Remove the wall bracket and fasteners from the packaging.
2. Place the wall bracket onto the chosen concrete wall and adjust it until it is in a horizontal position.
3. Mark the positions to drill holes using the wall bracket as the template.
4. Drill holes according to the marks you have made.

DANGER

In order to avoid electrical shock or other injury, inspect if there is electricity or plumbing installations before drilling holes.

5. Attach the wall bracket to the wall with the supplied expansion bolt set. The torque for fastening the nut should be at least 35 N·m.



No.	Description
1	Concrete wall
2	Expansion cylinder (M10x80)
3	Wall bracket
4	Washer
5	Spring washer
6	Hexagonal socket nut

Fig. 4-4 Fasten the Wall bracket against Concrete Wall

6. Lift up the inverter above the wall bracket with the help of other people and then slide down. Make sure that the grooves on the back of the inverter and the hooks on the wall bracket engage perfectly, as shown in Fig. 4-5.

NOTICE

The installers must wear gloves to avoid scratches when mounting the inverter.

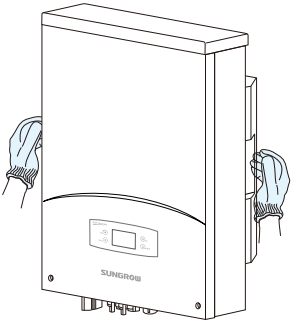
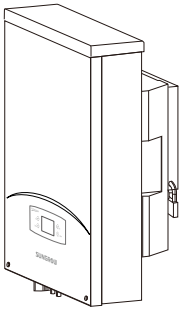


Fig. 4-5 Installing the Inverter

7. To protect the inverter from theft, you can lock it to the wall bracket with a theft-proof device and a padlock.



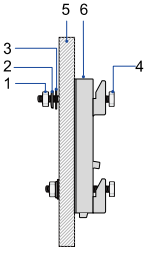
On Metal Frame

If the chosen mounting location is metal frame, please proceed as follows to mount the inverter.

1. Remove the supplied wall bracket from the packaging.
2. Choose the best installation site according to above requirements. Place the wall bracket onto the chosen metal frame and adjust it until it is in a horizontal position.
3. Mark the positions to drill holes by using the wall bracket as the template.
4. Drill holes at the marks you have made.

> If the shape of the metal frame does not fit the holes on the wall bracket, you need to re-drill holes on the wall bracket at appropriate position according to the chosen frame.

5. Fasten the wall bracket against the metal frame with bolts and nuts. The dimensions of fasteners used in the following diagram are recommended. The torque for fastening the nut is 35 N·m.



No.	Description	Remark
1	Hexagonal socket nut	M10
2	Spring washer	------
3	Washer	------
4	Hexagonal bolt	M10x45
5	Metallic wall	------
6	Wall bracket	------

Fig. 4-6 Fasten Wall bracket against Metal Frame

6. Lift up the inverter above the wall bracket with the help of other people and then slide down. Make sure that the grooves on the back of the inverter and the hooks on the wall bracket engage perfectly.

NOTICE

The installers must wear gloves to avoid scratches when mounting the inverter.

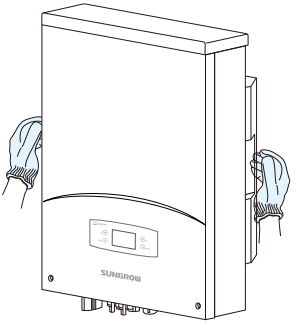
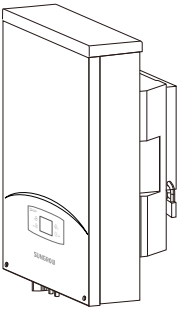


Fig. 4-7 Attaching Inverter onto Wall bracket

7. To protect the inverter from theft, you can lock it to the wall bracket with a theft-proof device and a padlock.



5 Electrical Connection

Once the inverter is firmly attached to the appropriate location, it can be connected into the PV power system.

⚠ WARNING

Improper operation during the wiring process can cause fatal injury to the operators or unrecoverable damages to the inverter.

Only qualified personnel can perform the wiring work.

Prior to any electrical connection, keep in mind that the inverter has dual power supplies. It is mandatory for the technical personnel to wear personal protective equipments during the electrical work: helmet, footwear and gloves.

5.1 Overview of Electrical Connection

Connecting inverter to the existing PV system includes connecting inverter to local grid and connecting inverter to PV arrays. There may be communication connection for monitoring if necessary.

All electrical connection should follow the National Wiring Rules of Standard AS/NZS 3000. The requirements in AS 4777.1 and AS/NZS 3000 indicate that a DC isolator must be used before the inverter.

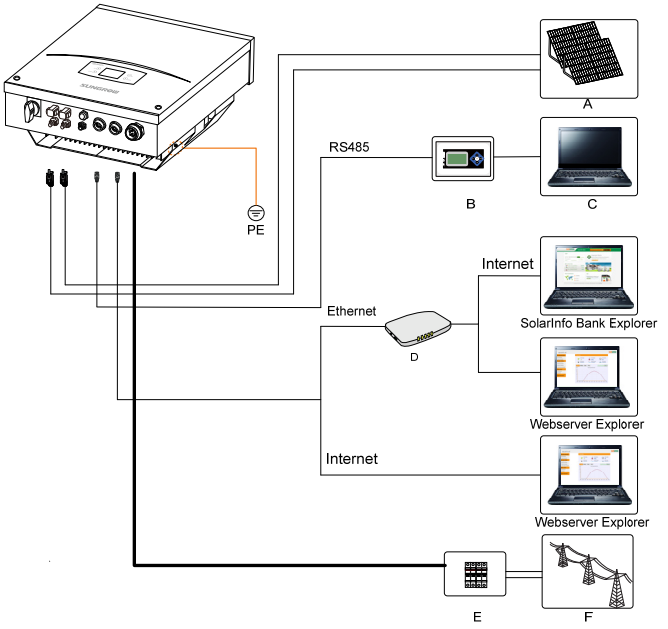


Fig. 5-1 Electrical Connection Diagram

Item	Description	Remark
A	PV arrays	The maximum open-circuit voltage of each PV string is 1000 V.
B	SolarInfo logger	It can be ordered from SUNGROW. Or use compatible logger from Meteo-Control, Solar-Log or Papendorf SE
C	Remote PC	User uses this device to monitor the whole PV system.
D	Router/Switch	Used as data transferring device between inverter and the Internet/Webserver, to monitor the whole PV system
E	AC circuit breaker	Used as a protective device during electrical connection. User equips this device according to the maximum output voltage and current.
F	Utility Grid	Rated AC voltage is 230 V.

5.2 Terminals Description

All electrical terminals are located at the bottom of the inverter. Fig. 5-2 shows the connection area.

Enough space around the inverter should be kept for electrical connection when choosing the installation site.

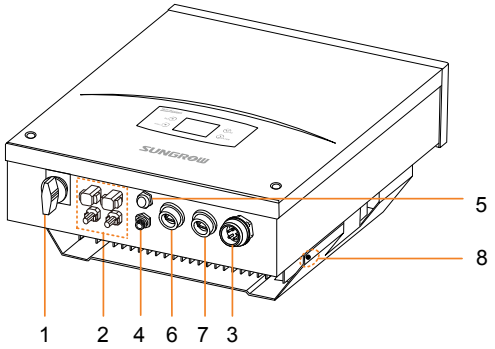


Fig. 5-2 Terminals Description

Item	Description
1	Integrated DC switch
2	DC connectors: MC4
3	AC connection terminal
4	WiFi connection terminal
5	DI connection terminal
6	RS485 connection terminal
7	NET connection terminal
8	Second PE terminal

5.3 Connecting Inverter to Grid

5.3.1 AC Side Requirements

Only after receiving prior approval from the local grid company as required, should you connect the inverter to the grid.

AC Side Circuit Breaker

An independent three or four-pole circuit breaker for the inverter must be installed at the output side to ensure that the inverter can be securely disconnected under load.

Inverter Type	Specification for AC Circuit Breaker
SG3KTL-EC	10A
SG4KTL-EC	10A
SG5KTL-EC	16A
SG6KTL-EC	20A

NOTICE

- **It is not allowed for several inverters to use the same circuit breaker.**
- **It is not allowed to connect loads between the inverter and circuit breaker.**

Residual Current Device

With an integrated universal current-sensitive residual current monitoring unit inside, the inverter is able to distinguish the fault currents from normal capacitive leakage currents. The inverter will disconnect from mains as soon as a fault current with value exceeding the limit has been detected.

However if an external RCD or residual current breaker is mandatory, the switch must be triggered at a failure current of 300 mA or higher.

Requirements of Multiple Inverters in Parallel Grid Connection

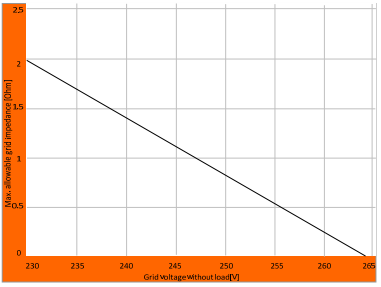
If several inverters are operated in parallel connection to grid, different requirements should be obeyed (See technical information "***Technical notes for multiple-paralleled grid-connected inverters***" in the download area of SUNGROW website).

AC Cable Requirements

The grid is connected to the inverter via 5 wires (L1, L2, L3, N and PE). Feed-in power is always three-phase via AC terminal at the bottom of the device.

Consider the following facts when selecting AC cables specifications and types:

- The grid impedance of the AC cables must correspond to the specification to avoid unintended disconnection from the grid or derating of the output power.



- The maximum cable length depends on the cable cross-section area, as shown in the following table. Note that the power loss of the cables should be within 1% of the nominal power.

Type	Single Conductor Cross Section		Total Outer cable diameters		Maximum Cable Length
	Range	Recommended	Range	Recommended	
SG3/4/5/6K TL-EC	4…10 mm^2(AWG11…AWG7)	4…10 mm^2 (AWG11…AWG7)	11…20 mm	15 mm	100 m

- Withstand ambient temperature;
- Layout type (inside wall, underground, free air etc.);
- UV resistance and so on.

5.3.2 Assembling AC Cables to Connector

The inverter is equipped with water-proof connector for AC connection, which matches the AC terminal at the bottom of the inverter.

DANGER

Danger to human life due to high voltage existing inside the inverter!

- **Make sure that all the AC cables to the inverter are not live before the electrical work.**
- **Do not turn on the AC circuit breaker until all electrical connections are completed.**

Prior to connecting to the utility grid, verify whether the grid voltage and frequency are within the range of inverter output parameters, referred to "**12 Appendix**". Consult local grid company for solution, if otherwise.

All AC cables should be equipped with correctly colored cables for distinguishing. Please refer to related standards about wiring color.

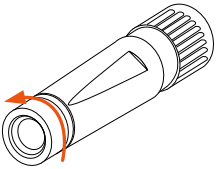
Connecting Inverter to AC Grid

NOTICE

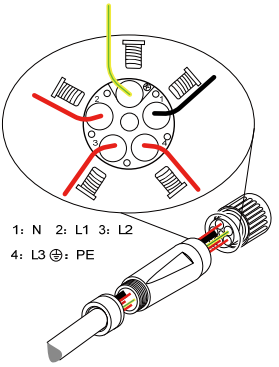
Observe the terminal layout of AC connector. If a phase wire is connected to the "PE" terminal, it may permanently destroy the inverter.

AC Wiring Procedure

1. Unscrew the water-proof terminal in the following direction.



2. Insert appropriate size AC cables into the water-proof terminal.
3. Strip off insulation layer of all AC cables. The length of strip insulation is approximately 10 mm.
4. Fix all cables ends to the corresponding terminals with the torque of 1 N·m according to markings on the connector, especially "PE" cable. If a phase wire is connected to the "PE" terminal, it may permanently destroy the inverter.



5. Pull cables outwards to confirm whether they are installed firmly.
6. Combine the two front-end parts together with the torque of 2 N·m.
7. Tighten the water-proof terminal with the torque of 5 N·m in opposite direction.
8. Make sure the AC and DC circuit breakers are disconnected.
9. Connect phase cables and "N" cable to AC circuit breaker.
   - Plug AC connector to corresponding AC terminal.
   - Screw AC cables except the "PE" cable to the AC circuit breaker.
10. Connect AC circuit breaker to the utility grid.
11. Make sure all AC cables are firmly installed.

5.4 Connecting Inverter to PV Arrays

⚠ DANGER

Lethal voltage exists!

PV arrays produce electrical energy when exposed to light and thus can create an electrical shock hazard. Cover the PV arrays with opaque materials and then perform the wiring. Wiring should be performed only by qualified personnel.

NOTICE

Make sure that the maximum input-ground capacity of the inverter is less than (0.12 uf/kW) * 3 kW/4 kW/5 kW/6 kW, otherwise the inverter will not function properly.

WARNING

Before connecting the PV arrays to the inverter, make sure that the impedances between the positive terminal of the PV string and Earth and the impedances between the negative terminal of the PV string and Earth are larger than 200 Kohm.

NOTICE

There is a risk of inverter damage! The following requirements should be met, otherwise they will lead to loss of any and all warranty rights.

- **Make sure that the maximum short circuit current of each DC input is less than inverter allowable limit.**
- **Make sure that the maximum open voltage of each string is less than 1000 V. Voltage over 1000 V can damage the inverter.**

If the input line is changed, such as input line falls off, panels configuration modified, etc. You need to reset the work mode.

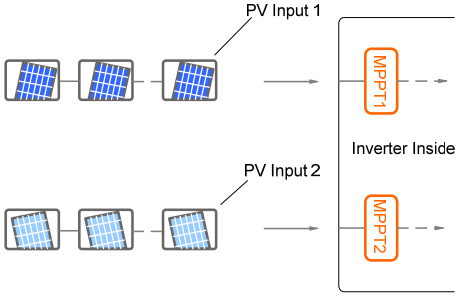
5.4.1 PV Inputs Configuration

The inverter has two PV input areas DC1 input and DC2 input, each with its MPP tracker. The two PV inputs can be configured in independent mode or parallel mode.

PV Configuration Mode-Independent Mode

For independent mode, the two PV inputs work independently, each with its own MPPT. Therefore the two PV inputs can be different from each other in PV module types, numbers of PV panels in PV strings, tilt angles and orientation angles of PV modules.

As shown in the following figure, the inverter should be configured to independent mode due to different orientation angles between the two PV inputs.



To make sure the maximum DC power, PV strings connected to individual input area should have a homogenous structure, i.e. the same type, the same number, the same identical tilt and identical orientation.

Prior to connecting inverter to PV inputs, the following specifications should be met:

Type	Area	DC Power Limit for Each Input	Open-circuit Voltage Limit for Each Input	Short-circuit Current Limit for Each Input
SG3KTL-EC	DC1 DC2	3191 W	1000 V	12.4 A
SG4KTL-EC	DC1 DC2	4255 W	1000 V	12.4 A
SG5KTL-EC	DC1 DC2	5265 W	1000 V	12.4 A
SG6KTL-EC	DC1 DC2	6312 W	1000 V	12.4 A

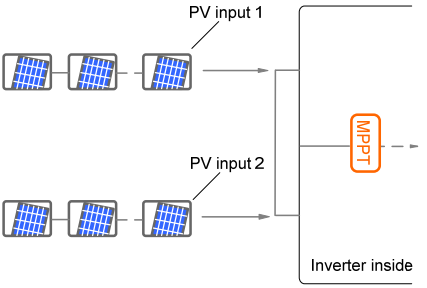
NOTICE

In independent mode, when there is only one PV input, the other input may produce induced voltage. DO NOT touch the unused DC terminals.

PV Configuration Mode-Parallel Mode

For parallel mode, all PV strings with the same type, the same number of PV panels, identical tilt and identical orientation in series can be connected to the same single input area. Two trackers are configured in parallel to handle power and/or current levels higher than those a single tracker can handle.

As shown in the following figure, the inverter may choose parallel mode since there is no difference between the two PV inputs. The terminals in DC1 input and DC2 input must be short-circuited by Y-type cable connector.



Prior to connecting the inverter to PV inputs, the following electrical specifications must be met simultaneously:

Type	Total DC Power Limit for Inverter	Open-circuit Voltage Limit for Each Input	Short-circuit Current Limit for Total Input
SG3KTL-EC	3191 W	1000 V	24.8 A
SG4KTL-EC	4255 W	1000 V	24.8 A
SG5KTL-EC	5265 W	1000 V	24.8 A
SG6KTL-EC	6312 W	1000 V	24.8 A

5.4.2 Assembling DC Cable to Connector

All DC cables are equipped with water-proof direct plug-in connectors, which match the DC terminals at the bottom of the inverter.

The positive and negative connectors are marked with polarity symbols and should be equipped with correctly colored cables.

e.g. Red cable should be connected with DC positive terminal while the blue one should be connected with the negative.

DC Cable Requirements

Type	Cross-Section Area Range	Outer Cable Diameters	Max. Withstand Voltage	Max. Withstand Current
SG3KTL-EC	4...6 mm^2 12AWG-10AWG	6…9 mm	1000 V	Same with short-circuit current.
SG4KTL-EC	4...6 mm^2 12AWG-10AWG	6…9 mm	1000 V	Same with short-circuit current.

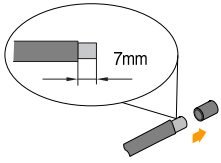
Type	Cross-Section Area Range	Outer Cable Diameters	Max. Withstand Voltage	Max. Withstand Current
SG5KTL-EC	4...6 mm^2 12AWG-10AWG	6…9 mm	1000 V	Same with short-circuit current.
SG6KTL-EC	4...6 mm^2 12AWG-10AWG	6…9 mm	1000 V	Same with short-circuit current.

DC Connector Assembling Procedure

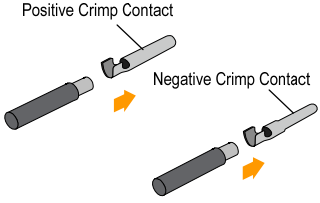
DANGER

Make sure that all the DC and AC cables to the inverter are not live before the electrical work.

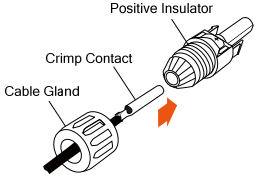
1. Strip off 7 mm insulation layer from all DC cables.

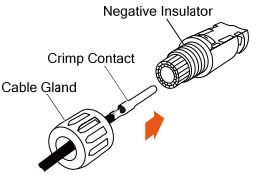


2. Assemble cable ends with crimp contacts by crimping pliers.



3. Lead cable through the cable gland.
4. Insert the crimp contact into the insulator until it snaps into place. Then pull gently to check if it is correctly engaged.
5. Screw the cable gland to front insulator with tightening torque 2.5…3 N·m.





For further assembly and connection instruction, please visit the webpage of the device manufacturer.

5.4.3 DC Wiring Procedure

DANGER

Make sure that none of the DC or AC cables connected to the inverter is live before the electrical work.

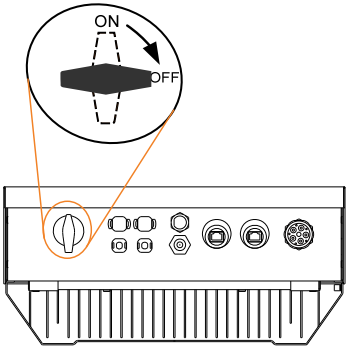
NOTICE

Make sure that the open circuit voltage does not exceed inverter input limit of 1000 V, even under the lowest operating temperature.

PV Connection of Independent Mode

Connect the inverter to PV arrays according to the following procedures:

1. Rotate the DC switch at the bottom to the "OFF" position.



2. Check the cable connection of PV strings for the correct polarity.

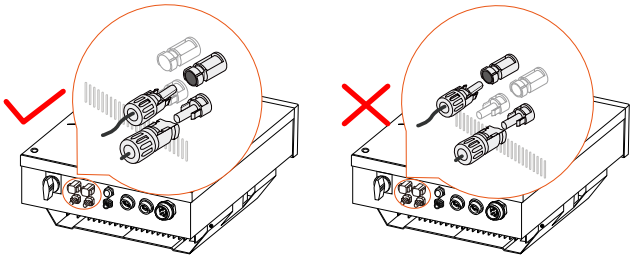
NOTICE

The inverter will not function properly if the DC polarities are reversed.

3. Plug the positive and negative DC connectors into corresponding terminals until there is an audible click.

NOTICE

Connect the same PV string to terminals of the same input areas. For example, connect the positive pole of a string to DC1 input and the negative pole to the DC1.



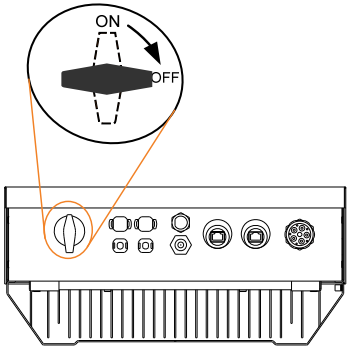
* Image shown here is for reference only. Actual product you receive may differ.

4. Connect other PV strings as the same procedures if necessary. Seal unused DC terminals with the terminal caps.

PV Connection of Parallel Mode

Connect the inverter to PV arrays according to the following procedures:

1. Rotate the DC switch at the bottom to the "OFF" position.



2. Check the cable connection of PV strings for the correct polarity.
3. Plug the positive and negative DC connectors into corresponding terminals until it click-locks into place.
4. The terminals in DC1 input and DC2 input must be short-circuited by Y-type cable connector.
5. Connect other PV strings in the same procedures if necessary.

5.5 Grounding the Inverter

WARNING

Because of the transform-less design of the inverter, DC positive pole and DC negative pole are not permitted to be grounded. A permanent destroy to the inverter may follows if otherwise.

5.5.1 Grounding System Overview

All non-current carrying exposed metal parts of the equipment and other enclosures in the PV power system should be grounded (e.g., PV arrays frame and inverter enclosure).

Where there is only one inverter in the PV power system, connect the “PE” cable to the installation ground.

Where there are multiple inverters in the PV power system, connect the “PE” cables of all inverters and mounting frame of PV arrays to the same copper bus bar. In this way, they are in equipotential connection.

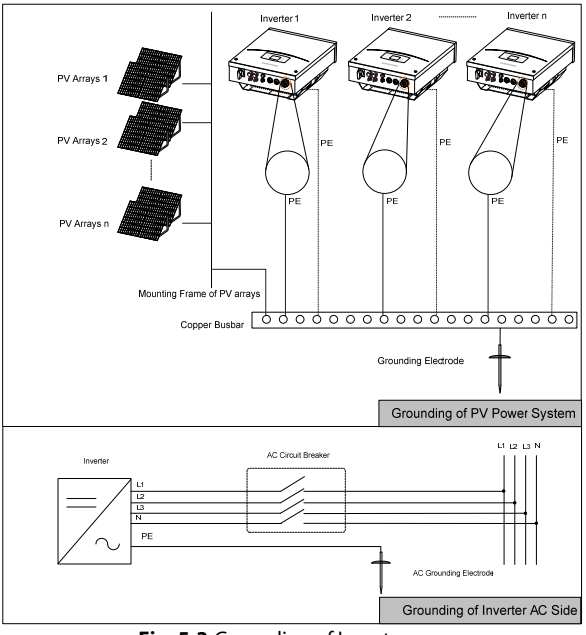


Fig. 5-3 Grounding of Inverter

5.5.2 Second Protective Earth Terminal

The inverters are equipped with second protective earth terminal as specified in EN 50178.

Second PE Terminal

There is a PE terminal on the right side of the inverter. You may choose to connect the PE.

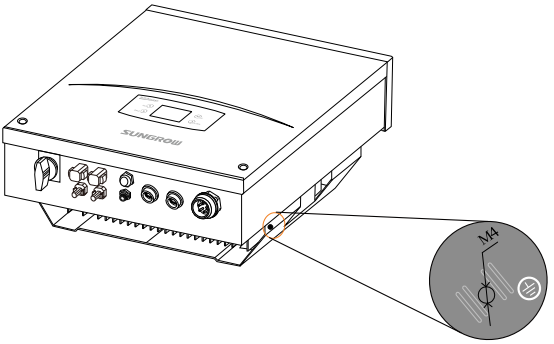
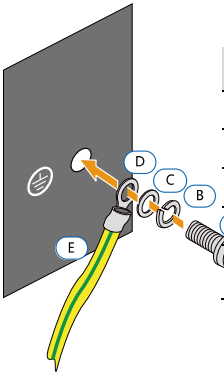


Fig. 5-4 Second PE Terminal

Second PE Connection



Item	Description	Specification
A	Screw	M4×12 mm
B	Spring washer	-
C	Washer	-
D	Cable socket	-
E	Yellow-green cable	6 mm^2-10 mm^2 copper wire or 10 mm^2-16 mm^2 aluminum wire

Fig. 5-5 Connection of the Second PE Connection

5.6 Communication Connection

5.6.1 Interfaces Overview

All communication terminals are located on the bottom of the inverter.

There are three optional connection ports on the bottom of the inverter: RS485 serial communication with RJ45 port (RS485), Ethernet communication with RJ45 port (NET) and WiFi connection terminal.

- For RS485 serial communication, the inverter operation information can be transferred via RS485 port to a PC with monitoring software, or to data logging device (such as MC Logger). The inverter operation information can also be transferred via WiFi terminal to a PC with monitoring software, or to SolarInfo Bank via the router.
- For Ethernet communication, the inverter operation information can be transferred via NET port to a PC with monitoring software, or to Webserver, or to SolarInfo Bank via the router.

Before communication connection, prepare communication cables and RJ45 plugs.

NOTICE

Cable requirements to ensure quality of communication:

- **Shielded network cable**
- **DI connection cable**

A converter such as RS485-232 converter or SolarInfo Logger, which converts 485 signal to 232 signal, is needed between the inverter and PC.

5.6.2 RS485 Communication Connection

The inverter has been terminated with a resistor of 120 Ω. The shielding layer of network cable should be single-point grounded.

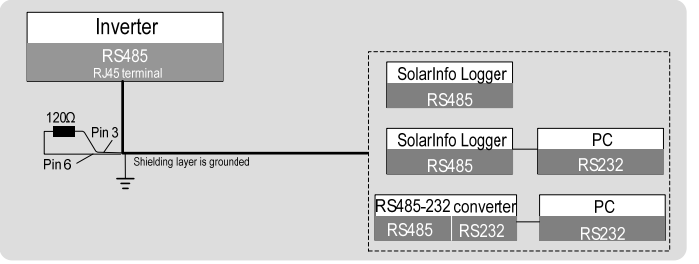
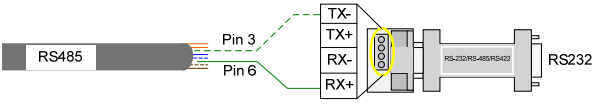


Fig. 5-6 Inverters RS485 communication connection

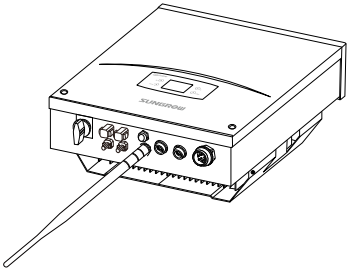
If the communication system is equipped with SolarInfo Logger, inverters may be remotely monitored via SolarInfo Bank.

SolarInfo logger and RS485-232 converter are optional parts and can be ordered from SUNGROW.



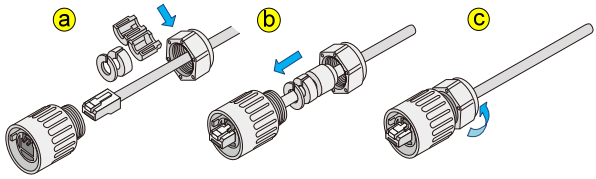
WiFi Connection Procedure

1. Unscrew the waterproof lid from the WiFi terminal.
2. Screw the WiFi antenna to WiFi terminal with appropriate torque.

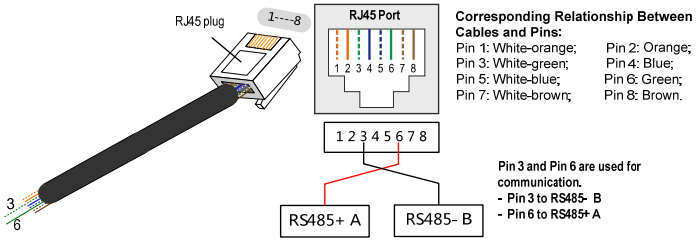


RS485 Connection Procedure

1. Remove the waterproof lid from the RS485 port.
2. Insert the RJ45 plug into the front plug connector until it makes a clicking sound. Install the plastic rings then tighten the cable gland with appropriate torque.



3. Pull cable outwards to confirm whether it is fastened firmly.
4. Plug the other end of network cable into the socket of the switch or router, then connect the switch or router to a PC.
5. As for the wires which connect to the terminating resistor or logging devices, use a Network cable crimping plier to strip the insulation layer and connect the RS485 A and B cables (3 and 6) to terminating resistor or data logging device or RS 485-232 converter.



6. Connect the other devices. Refer to the device manual for the definition of the communication port.
7. Verify the communication connection and configure the communication parameters.

If there is more than one inverter to communicate with a PC or a data logger, it is crucial to configure the communication parameters of each inverter. See "**10.9.3 Setting Communication Parameters** ".

5.6.3 Ethernet Communication Connection

You can connect the inverter to PC through NET port to set up Ethernet communication. Network cable with RJ45 plugs enables connection between the inverter and PC.

The Ethernet communication can be connected either in single or star topology.

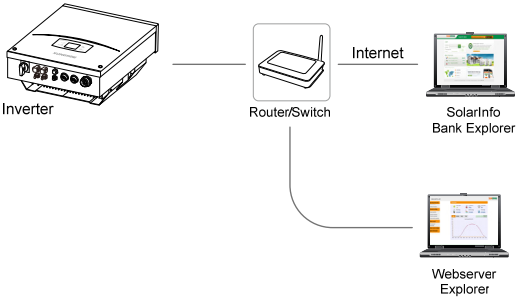


Fig. 5-7 Single inverter Ethernet connection

The Ethernet communication of the daisy chain is done via external router or switch.

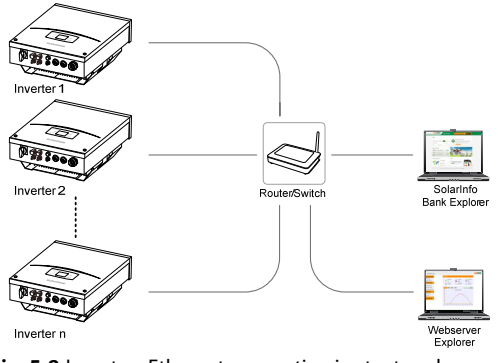


Fig. 5-8 Inverters Ethernet connection in star topology

The maximum number of inverters connected depends on switch, router and other factors. Please refer to switch's or router's manual to obtain the limit.

The Network cable should be less than 100 m.

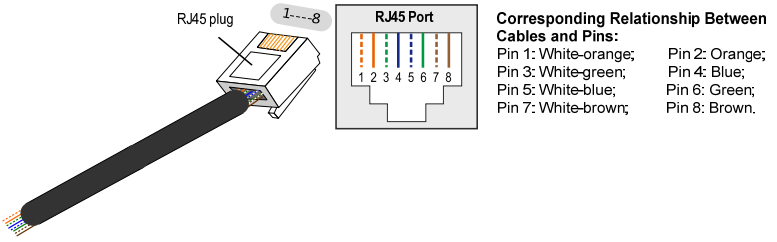
By logging into the Webserver explorer you can view and set the operation parameters of a single inverter. Please refer to **"6 Visiting and Configuring the Webserver"** for detailed operation of the Webserver.

NOTICE

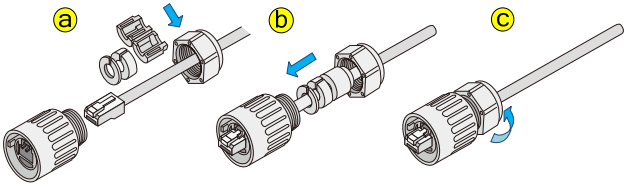
The related parameters settings can be changed only by qualified personnel!

Ethernet Connection Procedure

1. Remove the waterproof lid from the NET port.
2. Use the Ethernet crimper to crimp the cable and connect the cable to RJ45 plug according to TIA/EIA 568B.


RJ45 plug
1----8
RJ45 Port
1 2 3 4 5 6 7 8
Corresponding Relationship Between Cables and Pins:
Pin 1: White-orange; Pin 2: Orange;
Pin 3: White-green; Pin 4: Blue;
Pin 5: White-blue; Pin 6: Green;
Pin 7: White-brown; Pin 8: Brown.

3. Insert the RJ45 plug into the front plug connector until it makes a clicking sound. Install the plastic rings then tighten the cable gland with appropriate torque.



4. Repeat step 1 to step 3 to connect the other inverters with Network cables.
5. Pull cables outwards to confirm whether they are fastened firmly.
6. Plug the other end of network cable into the sockets of the switch or router, connect the switch or router to a PC. Refer to the device manual for the definition of the communication port.
7. Verify the communication connection and configure the communication parameters.

If there is more than one inverter to communicate with a PC, it is crucial to configure the communication parameters of each inverter. See "**10.9.3 Setting Communication Parameters** ".

5.6.4 Power Control Configuration

There is a terminal (DI) located on the bottom of the inverter for power control configuration.

Prior to DI connection, please prepare additional required material:

Item	Type	Description
1	DI connection cable	DI: 5 cores cable Total diameter: 4…8 mm
2	Stripping plier	--
3	Six-pole plug	Contained in the delivery.
4	Screwdriver	--

Power Control Settings

The inputs of DI can be used to connect a ripple control receiver for active power control, it set as active power control by default. Please refer to "**6.6 Power Control Configuration**" for DI programming.

Each state has seven functions to choose from, different statues of four digital inputs are the configuration functions of corresponding actions:

- Active power limitation setting (0-100%)
- Reactive power ratio setting (0-100%)
- Power factor setting (0.800-1.000)
- Start
- Stop
- Active power limitation and reactive power ratio setting
- Active power limitation and power factor setting

Where there is only one inverter, users can perform default active power limitation function by connecting the inverter to the ripple control receiver.

Where there are several inverters, set the inverter directly connected to the ripple control receiver via Webserver as the master inverter (communication role). Select proper communication interface in Webserver according to the communication cables among the inverters.

Default function configuration of DI is active power limitation: 0%, 30%, 60%, 100%. To change this setting, please login the Webserver.

NOTICE

The abovementioned settings are needed only during inverter initialization or after the load default operation.

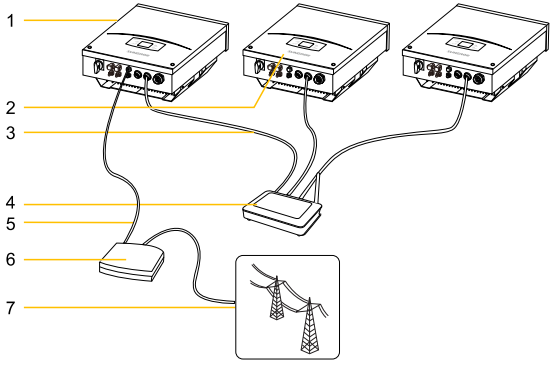


Fig. 5-9 Connecting the ripple control receiver for inverters with Ethernet connections

In the Ethernet communication connection, only one inverter can be set as master inverter, others shall be set as slave inverters.

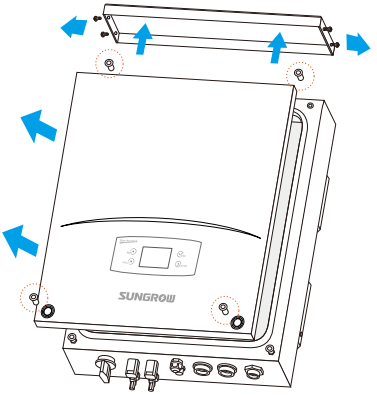
Item	Description
1	Master inverter
2	Slave inverter
3	Ethernet cable
4	Router
5	5-conductor connection at digital input
6	Ripple control receiver
7	Grid

Connect the cables to DI terminal block according to the terminal assignment.

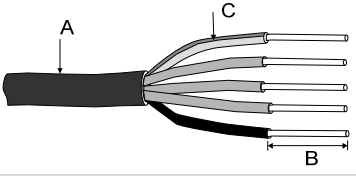
DANGER

Make sure that all DC or AC cables connected to the inverter are not live before the electrical work.

1. Remove the waterproof lid from DI cable gland and loosen the Thread-Lock Sealing Nut.
2. Loosen all screws on the top cap and remove the top cap of the inverter, then loosen all screws on the lid and remove the lid.

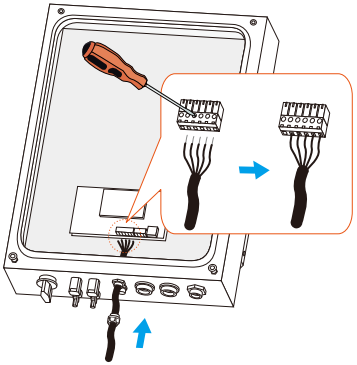


3. Lead the DI connection cables through the Thread-Lock Sealing Nut and the cable gland.
4. Strip off the DI cables as shown below.

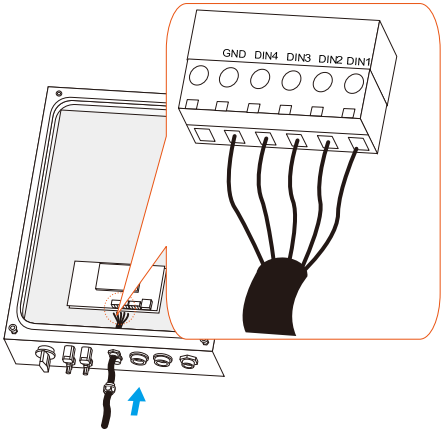


No.	Description	Remark
A	Protective layer	Accepted cable external diameter ranges from 4 mm to 8 mm.
B	Length of insulation to be stripped off	7 mm
C	Length of protective layer to be stripped off	60 mm

5. Assemble the individual insulated conductor into corresponding pin of the six-pole plug with a suitable screwdriver and pull cables outwards to confirm whether they are installed firmly.



6. Insert the six-pole plug into the DI connection socket according to markings shown below.



7. Fasten the Thread-Lock Sealing Nut to the inverter.

NOTICE

Before fasten the lid, please make sure:

- **Whether it's necessary to apply glue on the cut;**
- **The rubber strip is fully filled with air.**

8. Fasten the lid and the top cap to the inverter.
9. Connect the ripple control receiver to the inverter according to the terminal assignment.

6 Visiting and Configuring the Webserver

6.1 User and Authority

The Webserver provides user permission and installer permission. To avoid two or more persons to change the inverter configurations at the same time, only one person can login to Webserver at a time.

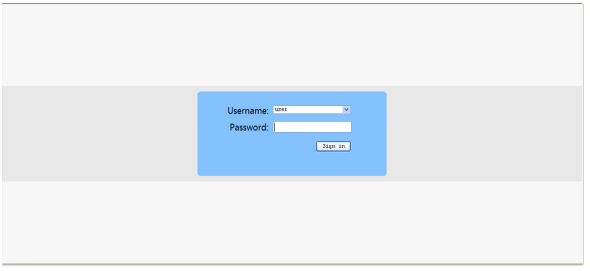
Therefore, once a person logs in and does not exit, other person cannot log in anywhere else. Close the webpage when logging out. After logging out, it will take at most 4s until the user log in again.

6.2 Login Interface

Query the inverter IP address corresponding to the instructions in **10.9.3 Setting Communication Parameters** . Open the browser and input the inverter's IP address.

User should select username **user** after signing in with the default sign in password of **1111**. User can change the password after signing in.

After inputting the username and password, press "Sign in" or "Enter" to log in.



If there is no operation for 10 minutes, system will automatically return to the login interface.

6.3 Main Interface

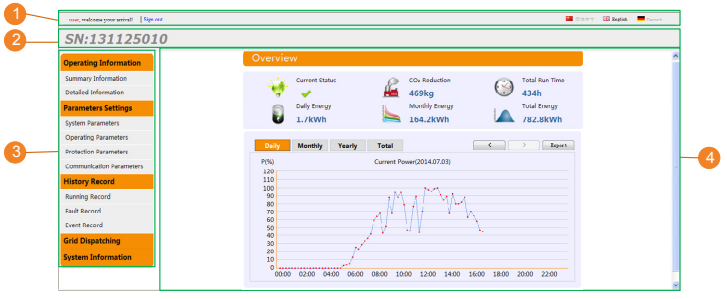
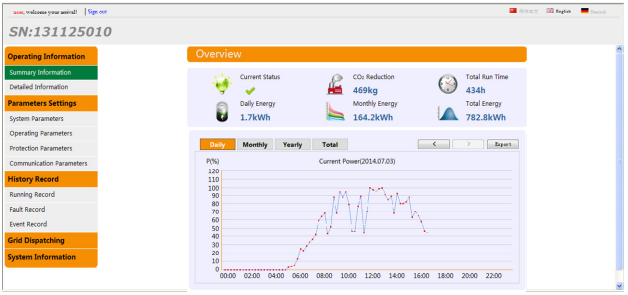


Fig. 6-1 Webserver-user interface

No.	Name	Description
1	Status bar	Language selection and user login information.
2	Device info	The serial number of the running inverter.
3	Navigation bar	Operation information, parameter setting, history record, grid dispatching, system information, in which, parameter setting and history record have their second level menus.
4	Display area	Detailed information of the selected navigation bar.

6.3.1 Summary Information

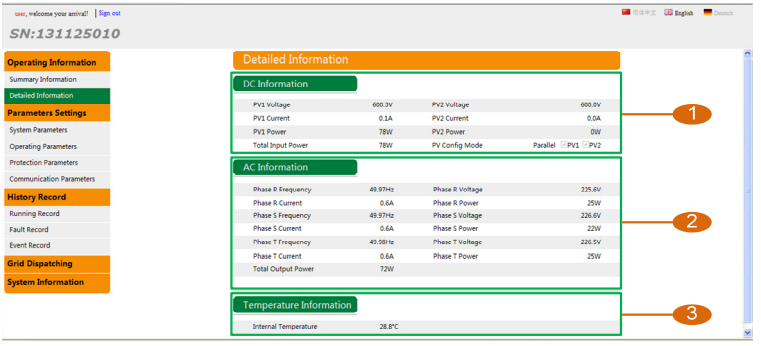


The default interface after login displays the read-only information: current status, CO_2 reduction, total run time, daily energy, monthly energy, total energy, daily power curve, monthly energy histogram, yearly energy histogram, and total energy histogram. You can use the "Export" button to export data as a csv file.

Tab. 6-1 Explanation of the icons

Icon	Name	Description
	Current status	: Inverter is not in the fault state; : The inverter is in fault state. (DSP and LCD communication fault, and the fault of the inverter.)
	CO_2 reduction	CO_2 reduction due to the use of inverter
	Total runtime	Inverter total running time
	Daily energy	Energy yields of the present day
	Monthly energy	Energy yields of the present month
	Total energy	Total energy yields since the inverter connects to the grid

6.3.2 Detailed Information



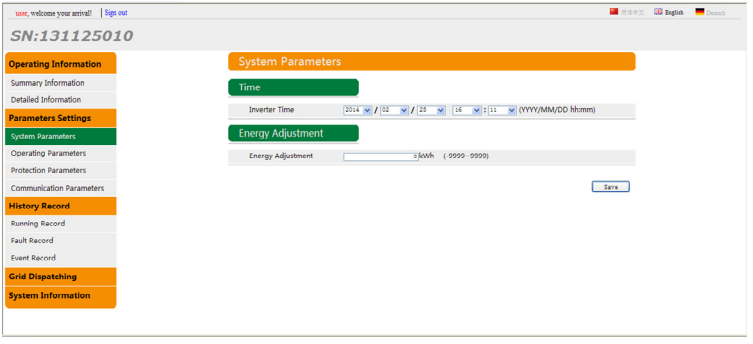
The detailed read-only information is shown below:

No.	Name	Description
1	DC information	PV1 and PV2 voltage, PV1 and PV2 current, and total input power and so on.
2	AC information	AC side information
3	Temperature information	Inverter internal temperature

6.4 Parameter Settings

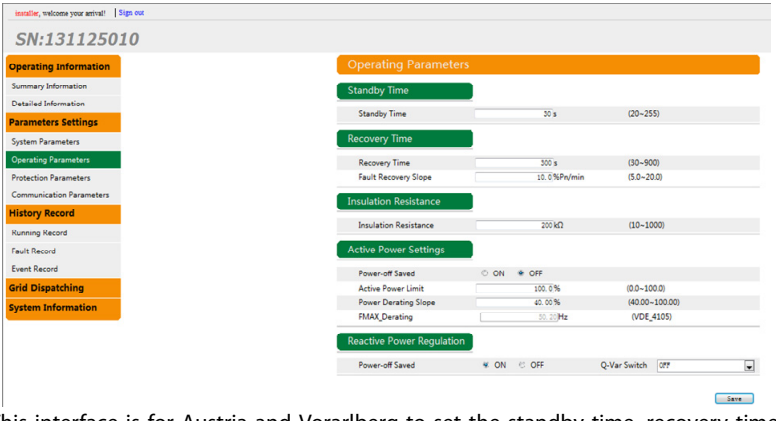
Parameter settings include system parameters, operating parameters, protection parameters, and communication parameters.

6.4.1 System Parameters

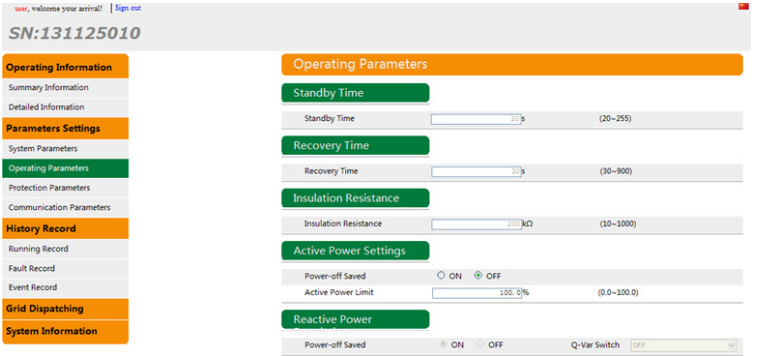


This interface is to set time and energy adjustment.

6.4.2 Operating Parameters



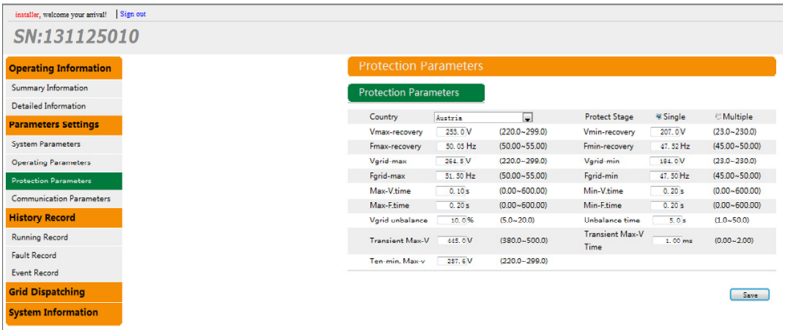
This interface is for Austria and Vorarlberg to set the standby time, recovery time, insulation resistance, active power settings, and reactive power regulation.



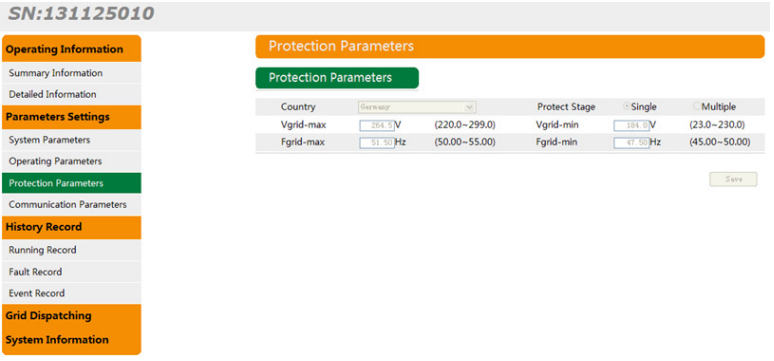
This interface is for Germany and others to set the standby time, recovery time, insulation resistance, active power settings, and reactive power regulation.

To set the Q(P) or Q(U) parameters, please contact SUNGROW to get the installer authority first.

6.4.3 Protection Parameters



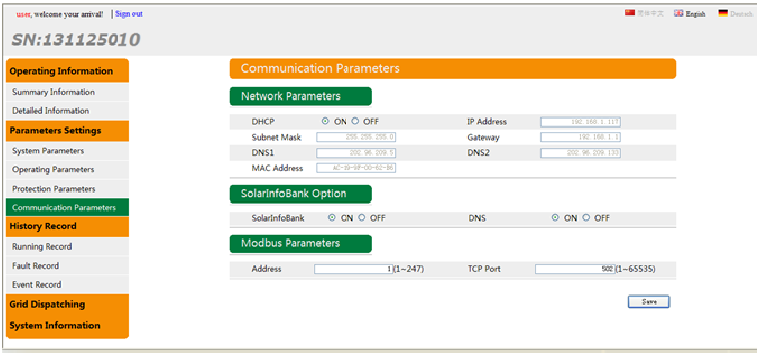
This interface is for Austria and Vorarlberg to select the grid codes, such as voltage, country, single protect stage or multiple protect stage.



This interface is for Germany and others to select the grid codes, such as voltage, country, single protect stage or multiple protect stage.

To set protection parameters mentioned above, please contact SUNGROW to get the installer authority first.

6.4.4 Communication Parameters



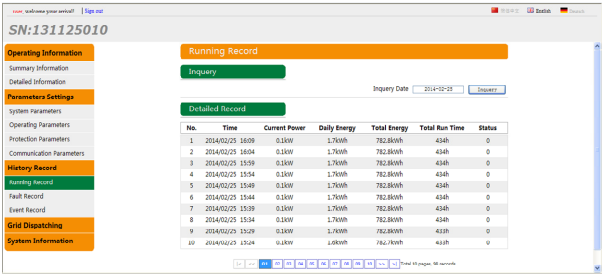
This interface is to set the related communication parameters. The newly set parameters will not be effective immediately. System will adopt the new communication parameter after exiting.

Both users and installers can set abovementioned communication parameters.

6.5 History Record

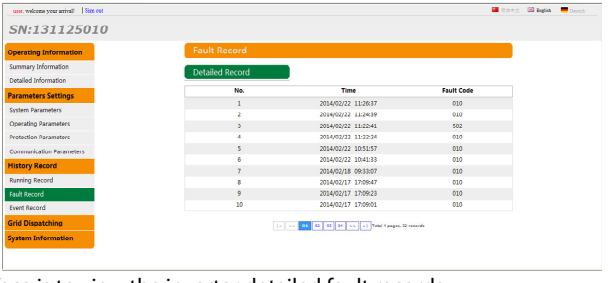
History record includes the running record, fault record, and event record.

6.5.1 Running Record


SN:131125010
Operating Information
Summary Information
Detailed Information
Parameters Settings
System Parameters
Operating Parameters
Protection Parameters
Communication Parameters
History Record
Running Record
Fault Record
Event Record
Grid Dispatching
System Information
Running Record
Inquiry
Inquiry Date
Inquiry
Detailed Record
No. Time Current Power Daily Energy Total Energy Total Run Time Status
1 2014/02/25 16:09 0.1kW 1.7kWh 782.8kWh 434h 0
2 2014/02/25 16:04 0.1kW 1.7kWh 782.8kWh 434h 0
3 2014/02/25 15:59 0.1kW 1.7kWh 782.8kWh 434h 0
4 2014/02/25 15:54 0.1kW 1.7kWh 782.8kWh 434h 0
5 2014/02/25 15:49 0.1kW 1.7kWh 782.8kWh 434h 0
6 2014/02/25 15:44 0.1kW 1.7kWh 782.8kWh 434h 0
7 2014/02/25 15:39 0.1kW 1.7kWh 782.8kWh 434h 0
8 2014/02/25 15:34 0.1kW 1.7kWh 782.8kWh 434h 0
9 2014/02/25 15:29 0.1kW 1.7kWh 782.8kWh 434h 0

This interface is to search the running information of the inverter. The default display is the running record of the preset day with 10 records in each page. If there is more than 10 records, system will automatically list them in different pages.

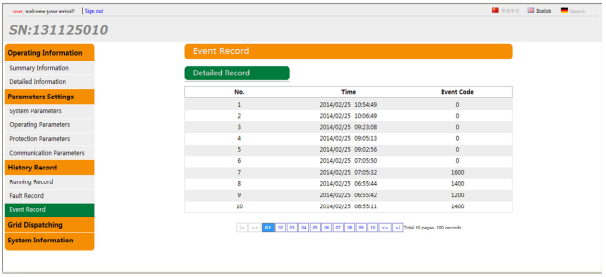
6.5.2 Fault Record



This interface is to view the inverter detailed fault records.

At most 100 fault records can be stored with 10 records in each page.

6.5.3 Event Record



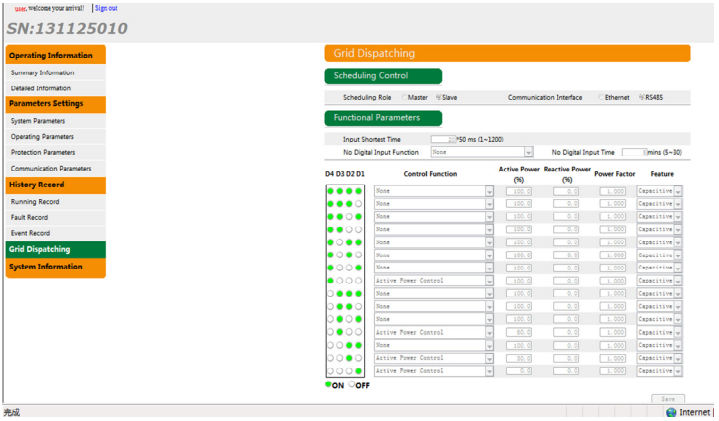
This interface is to view the inverter event records. At most 100 event records can be stored with 10 records in each page.

6.6 Power Control Configuration

This interface is to set the grid dispatching parameters. The different statues of four digital inputs are the configuration functions of corresponding actions.

Four inputs can be used to connect a power grid dispatch device (ripple control receiver). A closed relay represents status 1 while open relay is 0.

The default state is 0000, which all four inputs are open. It cannot be applied to power grid dispatch.



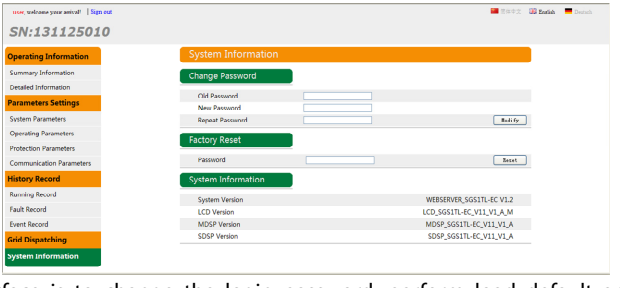
In the event of Ethernet connection as shown in Fig. 5-9, inverter can be the master or the slave during grid dispatch. If the inverter is the master, it can dispatch other salve pieces through the NET port.

NOTICE

It is recommended to perform grid dispatching as per default setting of each configuration status.

The change of related parameters must be done only by qualified personnel. Any breach may void warranty claims from SUNGROW.

6.7 System Information



This interface is to change the login password, perform load default and check system information.

7 Commissioning

Commissioning is a critical part for a well-installed PV system, which can protect against fires, injury and electrical shock.

7.1 Inspection before Commissioning

Before starting the inverter, you should check the following items.

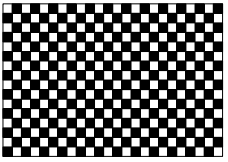
1. The inverter is accessible for operation, maintenance and service.
2. Re-check that the inverter is firmly installed onto the wall.
3. Space for ventilation is sufficient for one inverter or more than one inverter.
4. Nothing is left on the top of the inverter.
5. Inverter and accessories are correctly connected.
6. Cables are routed in safe place or protected against mechanical damage.
7. The selection of AC circuit breaker is optimal.
8. Terminals not used underneath the inverter are sealed.
9. Warning signs & labels are suitably affixed and durable.

7.2 Commissioning Procedure

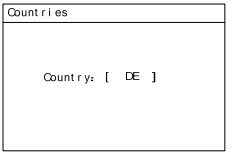
If all checking items mentioned above meet the requirements, preceed as follows to start up the inverter for the first time.

1. Connect the external AC circuit breaker.

2. Rotate the DC switch to "ON" position.
   Suppose there are sufficient sunlight and enough DC power. PV arrays initialize and supply DC power to inverter.



3. Country selection screen will prompt. Perform country settings with the right two buttons. Detailed button functions can be found in "**10.1 Description of Button Function**". **Press** ▼ to choose country code. Confirm the settings by **Pressing ENTER**.

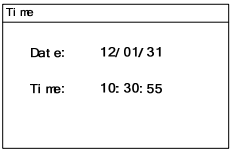


Refer to "**10.9.2 Selecting the Country** Code" for country code explanation. If the inverter is installed where the country code is not included, please choose the item "Other" and manually set the protective parameters.

⚠ CAUTION

If the country code is not set correctly during commissioning, reset the protective parameters as dictated in "10.9.2 Selecting the Country Code". There may be faults if otherwise.

4. Configure time according to the local time. Time setting is very important, which directly affects data logging. **Press** ➤ to move cursor and **Press** ▼ to scroll up time value. Confirm the settings by **Pressing ENTER**. The date format is **YY/MM/DD**. **YY, MM**, and **DD** stand for year, month, and day respectively. The time format is **hh/mm/ss**. **hh**, **mm**, and **ss** stand for hour, minute, and second respectively.



If inverter's commissioning fails, the "FAULT" indicator will be lit and "fault" will occur on the display. **Press** ▼ to view "current fault" information. Remove the existing malfunction and then repeat starting up inverter as the above procedures.

8 Disconnecting, Dismantling and Disposing of the Inverter

8.1 Disconnecting the Inverter

For maintenance or other service work, the inverter must be switched off. In normal operation, switching off is not necessary.

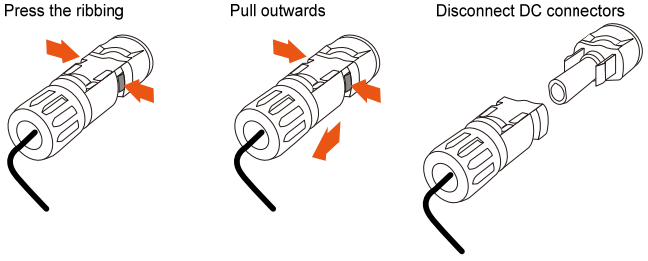
In order to disconnect the inverter from the AC and DC power sources, proceed as follows. Lethal voltages or damages to the inverter will follow if otherwise.

1. Stop the inverter through operating the LCD menu. For details, see "**10.6 Starting and Stopping the Inverter**".
2. Disconnect the external AC circuit breaker and prevent it from reconnecting.
3. Rotate the DC switch to the "OFF" position.

NOTICE

Please strictly follow the above procedures. Otherwise it will cause unrecoverable damage to the inverter.

4. Wait for about **ten** minutes until the capacitors inside the inverter have discharged.
5. Measure to confirm the AC output at the AC circuit breaker is voltage free.
6. Refer to "**5.3.2 Assembling AC Cables to Connector**" to release AC connector out of the inverter in reverse steps.
7. Release the locking part of DC connectors by pressing on the ribbing of the locking hooks with nipper pliers and pull it outwards.



For further disconnection and conductor reconnection instruction, please visit the webpage of device manufacturer.

8.2 Dismantling the Inverter

Refer to Chapter 4 and Chapter 6 for the inverter dismantling in reverse steps. If necessary, remove the wall bracket from the wall.

⚠ CAUTION

There is a risk of burn injuries and electric shock!

Wait at least 10 minutes after disconnecting the inverter from the utility grid and the PV input before touching any inner live parts.

NOTICE

If the inverter will be reinstalled in the future, please refer to Chapter 4 and Chapter 4.1 for a proper conservation.

8.3 Disposing of the Inverter

Users should take the responsibility for the disposal of the inverter.

NOTICE

Some parts and devices of the inverter, such as, LCD displayer, batteries, capacitors, may cause environment pollution.

Users must comply with the related local regulations to avoid the potential pollution.

9 Troubleshooting and Maintenance

9.1 Troubleshooting

9.1.1 Troubleshooting of LED Indicators

See "**Tab. 2-2 Description of LED Indicators**" for the definition of indicator states.

Fault Type	Troubleshooting
LED indicators and LCD screen cannot be lit	1. Disconnect the AC circuit breaker. 2. Rotate the DC Switch to the "OFF" position. 3. Check the polarity of DC input.
"RUN" indicator goes out	1. Disconnect AC circuit breaker. 2. Rotate the DC Switch to the "OFF" position. 3. Check the correctness of electrical connection of inverter. See "**Fig. 5-1 Electrical Connection Diagram**". 4. Check whether DC input voltage exceeds the inverter start voltage. 5. If all above conditions are OK, please contact SUNGROW.
"Fault" indicator is lit	1. A fault is not removed. 2. Perform troubleshooting in according to the fault type in LCD screen. See "**9.1.2 Troubleshooting of Faults in LCD Screen**". 3. If it cannot be solved, please contact SUNGROW.

9.1.2 Troubleshooting of Faults in LCD Screen

When faults occur, "Fault" state will be shown on the main screen. **Press** ▼ to view multiple "current fault" information pages.

Code of fault	Specification	Troubleshooting
0002	The grid voltage has exceeded inverter allowable upper limit.	1. Check the voltage of the grid. 2. If the grid voltage exceeds the permissible range of inverter protective parameters, ask utility grid company for solution.

Code of fault	Specification	Troubleshooting
		3. If the grid voltage is within the permissible range, contact SUNGROW Service Dept..
0003	Inverter has checked that the instantaneous sample value of the grid voltage exceeds the allowable limit for some time.	1. This is a short-term fault due to grid condition. Wait a moment for inverter recovery. 2. If the fault still exists, please contact SUNGROW Service Dept..
0004	The grid voltage has fallen below inverter's allowable lower limit.	1. Check the voltage of the grid. 2. If the grid voltage exceeds the permissible range of inverter protective parameters, ask utility grid company for solution. 3. If the grid voltage is within the permissible range, contact SUNGROW Service Dept..
0005	The grid voltage is too low.	
0007	Inverter has checked AC overcurrent temporarily.	1. The inverter will resume if the output current falls below the protective value. 2. If the fault still exists, please contact SUNGROW Service Dept..
0008	The grid frequency has exceeded inverter allowable upper limit.	1. Check the frequency of the grid. 2. If the grid frequency exceeds the permissible range of inverter protective parameters, ask utility grid company for solution. 3. If the grid frequency is within the permissible range, contact SUNGROW Service Dept..
0009	The grid frequency has fallen below inverter allowable lower limit.	
0010	Islanding	1. Check whether AC circuit breaker is triggered. 2. Check whether AC cables are all firmly connected. 3. Check whether grid is not on service. 4. If all conditions are OK and this fault still occurs in the LCD screen, contact SUNGROW Service Dept..
0011	The DC component of AC current has exceeded inverter limit.	1. Wait a moment for inverter recovery. 2. Contact SUNGROW if the fault reoccurs.
0012	Inverter has detected that there is a leakage current.	1. Check the PV strings for ground fault. 2. Contact SUNGROW if the fault reoccurs.
0014	The average grid voltage is not within the permissible range for over 10 minutes.	1. Check whether the grid is operating normally. 2. Wait a moment for inverter recovery. 3. Contact SUNGROW if the fault reoccurs.

Code of fault	Specification	Troubleshooting
0015	The grid voltage is too high.	1. Check whether the grid is operating normally. 2. Check AC cables for appropriate size. 3. Wait a moment for inverter recovery. 4. Contact SUNGROW if the fault reoccurs.
0017	The inverter has detected that there is unbalance among the three phase voltages. (**Only valid in Austria.**)	1. Wait a moment for inverter recovery. 2. Contact SUNGROW if the fault reoccurs.
0019	The bus voltage is temporarily high.	1. Wait a moment for inverter recovery. 2. Contact SUNGROW if the fault reoccurs.
0021	Inverter has checked that there is overcurrent of PV1 input.	Check the layout and the wiring of PV1 input.
0022	Inverter has checked that there is overcurrent of PV2 input.	Check the layout and the wiring of PV2 input.
0024	Inverter has checked the deviation of neutral point voltage.	1. The inverter will recover if the deviation value falls below the protective limit. 2. Contact SUNGROW if the fault reoccurs.
0028	Inverter has checked the reverse polarity of PV1 connection.	1. Disconnect the DC switch. 2. Disconnect inverter. 3. Check the polarity of the PV inputs, if the polarity is incorrect, please reconnect PV strings.
0029	Inverter has checked the reverse polarity of PV2 connection.	
0037	Enclosure over-temp The ambient temperature of the enclosure exceeds the threshold.	1. Check whether AC output power exceeds nominal power too much. 2. Check whether fans work normally and whether there are some abnormal fans. Please replace broken fan, in necessary. 3. Clean air grills of outlet. 4. If the fault still exists, please contact with SUNGROW.
0038	Relay fails Relay is in poor contact.	1. Wait a moment for inverter recovery. 2. Contact SUNGROW if the fault reoccurs.
0041	Leakage current sampling channel fault.	1. Wait a moment for inverter recovery. 2. Contact SUNGROW if the fault reoccurs.
0042	Current imbalance.	1. Wait a moment for inverter recovery. 2. Contact SUNGROW if the fault reoccurs.
0043	The ambient temperature is too low.	The inverter will recover if the ambient temperature rises above the protective limit.
0044	A fault is detected during	1. Wait a moment for inverter recovery.

Code of fault	Specification	Troubleshooting
	inverter self-detection. DC-AC conversion fails.	2. Contact SUNGROW if the fault reoccurs.
0045	Faults detected in PV1 boosted circuit.	1. Wait a moment for inverter recovery. 2. Contact SUNGROW if the fault reoccurs.
0046	Faults detected in PV2 boosted circuit.	
0048	Phase-R current sampling channel fault.	1. Wait a moment for inverter recovery. 2. Contact SUNGROW if the fault reoccurs.
0049	Phase-S current sampling channel fault.	
0050	Phase-T current sampling channel fault.	
100	Inverter overcurrent hardware protection AC current has exceeded the hardware limit.	1. Wait a moment for inverter recovery. 2. Contact SUNGROW if the fault reoccurs.
101	Grid over-frequency Grid frequency is outside the permissible range.	1. Check the voltage of the grid. 2. If the grid voltage exceeds the permissible range of inverter protective parameters, ask utility grid company for solution. 3. If the grid voltage is within the permissible range, contact SUNGROW Service Dept..
102	Grid under-frequency Grid frequency is outside the permissible range.	
103	Grid voltage synchronization fault The grid voltage sampling differences between the master and slave DSP.	1. Wait a moment for inverter recovery. 2. Contact SUNGROW if the fault reoccurs.
104	Grid frequency synchronization fault; The grid voltage sampling differences between the master and slave DSP.	
200	The bus voltage exceeds the set value of the hardware	1. Wait a moment for inverter recovery. 2. Contact SUNGROW if the fault reoccurs.
202	PV1 or PV2 current exceeds the set value of the hardware	
203	The PV input voltage exceeds the bus voltage.	1. Check the functionality of the PV connection terminal ; 2. Contact SUNGROW if the fault reoccurs.
300-301	The temperature of some	1. Check the functionality of the fans;

Code of fault	Specification	Troubleshooting
	components inside the cabinet is too high	2. Clean the air inlet and outlet; 3. Clean air grills of outlet. 4. If the fault still exists, please contact SUNGROW.
302	PV insulation resistance fault	1. Check whether the PV connection cables are intact. 2. Check whether the ambient humidity of PV components is too high. 3. Wait until the inverter reverts to normal; 4. Contact SUNGROW if the fault reoccurs.
307	Open circuit voltage of the PV array is too high, leading the input power exceeds the permissible range	1. Check whether the configuration of PV array exceeds the permissible range of the inverter. 2. Wait a moment for inverter recovery. 3. Contact SUNGROW if the fault reoccurs.
308	Accessary processor fault. Redundant fault detected.	1. Wait a moment for inverter recovery. 2. Contact SUNGROW if the fault reoccurs.
309-318	Voltage and current sampling fault before grid connection	1. Wait a moment for inverter recovery. 2. Contact SUNGROW if the fault reoccurs.
320	Leakage current CT self-check fault.	1. Wait a moment for inverter recovery. 2. Contact SUNGROW if the fault reoccurs.
401-409	Permanent fault	1. If there are no other problems and the inverter is required to keep operating, restart the inverter immediately. 2. Contact SUNGROW if the fault reoccurs.
501-502	Inverter internal communication failure.	Contact SUNGROW if the fault reoccurs.
503-508	Temperature sensor warning	Contact SUNGROW if the fault reoccurs.
510	The PV panel configuration exceeds the optimum operating range of the inverter.	1. Check whether the configuration of PV array exceeds the permissible range of the inverter. 2. Contact SUNGROW if the fault reoccurs.
511	Open circuit warning of the temperature sensor.	1. Wait a moment for inverter recovery. 2. Contact SUNGROW if the fault reoccurs.
512	Fan low-speed warning	1. Check the functionality of the fans; 2. Clean the air inlet and outlet; 3. Clean air grills of outlet. 4. If the fault still exists, please contact SUNGROW.
513	Fan blocking warning	
515	Boost short circuit warning.	Please contact SUNGROW Service Dept..

Should you have any problems in operating the inverter, please contact us:

Service hotline: +86 551 6532 7834/6532 7845

Email: service@sungrow.cn

We need the following information to provide you the best assistance:

- Type of the inverter
- Serial number of the inverter
- Fault code/name
- Brief description of the problem

9.2 Maintenance

9.2.1 Routine Maintenance

Item	Method	Period
Save data	Save the running data, parameters and log to a disk or a file.	Once 31 days
General state of system	Visual check for any damage or deformation of the inverter. Check any abnormal noise during the running of the inverter. Check each parameter of inverter operation. Check if the temperature of the housing is normal. Monitor the system using the thermal imager.	Every 6 months
System clean	Check the temperature and dust of the inverter. Clean the inverter enclosure, especially the heat sink. Check the humidity and dust of the environment. Meanwhile check whether the filter function of the air inlet is ok. Clean the air inlet and outlet, when necessary.	Six months to a year (it depends on the dust contents in air.)
Electrical connection	Check whether cable connections are loose. Tighten the loose connections. Check whether there is damage the cables, especially the surface in contact with metal. Check whether the wrap belt of the connection terminals is strip-off.	Six months after commissioning and then once or twice a year.
Fan	Check whether there is crack of the fan blade Check whether there is any abnormal noise when the fan is turning.	Once a year

Item	Method	Period
	Clean or replace the fan.	
Safety function	Check the LCD stop and emergency stop circuit of the system. Simulate shutdown and check stop signal communication. Check the warning labels, and replace them if necessary.	Once or twice a year
Software	Software optimization. Check the setting of every parameter.	Once or twice a year

9.2.2 Maintenance Instruction

DANGER

Disconnect the inverter from the grid first and then PV arrays before any maintenance work.

Lethal voltage still exists in the inverter. Please wait at least ten minutes and then perform maintenance work.

Replacing Fan

If there is overheat and abnormal noise, please wait a moment for the fan recovery. If the abnormal noise still exists after a moment, please contact SUNGROW Service Dept. to replace the fan.

DANGER

- **Disconnect the inverter from the grid first and then PV arrays before any maintenance work.**
- **Fans' maintenance work may only be performed by qualified electricians.**

Air Inlet and Outlet Cleaning

Check whether there is anything blocking the air inlet and outlet to maintain good ventilation.

Clean the air inlet and outlet with soft brush or vacuum cleaner if necessary.

Battery Maintenance

There is a button battery on the inner LCD PCB board. Contact SUNGROW Service Dept. to replace the battery when it is end of service life.

10 Operating the LCD Menu

10.1 Description of Button Function

Inverter offers two buttons for the user to look up the running information and configure parameters. The two buttons have multiple functions. Please refer to Tab. 10-1 before any operation onto inverter.

Tab. 10-1 Button Function

Button	Operation	Description
	Press less than one second	Move upwards or downwards, or increase setting value. Hereinafter, it is referred to as "Press ▼".
	Press more than one second	Return to the previous menu or cancel the command. Hereinafter, it is referred to as "Press **ESC**".
	Press less than one second	Move left or right, or turn pages. Hereinafter, it is referred to as "Press ➤".
	Press more than one second	Enter into the submenu or confirm the command. Hereinafter, it is referred to as "Press **ENTER**".

The background illumination of the LCD screen will go out to save power if there is no button operation for one minute. Reactivate it by pressing any button.

10.2 Inverter Menu Structure

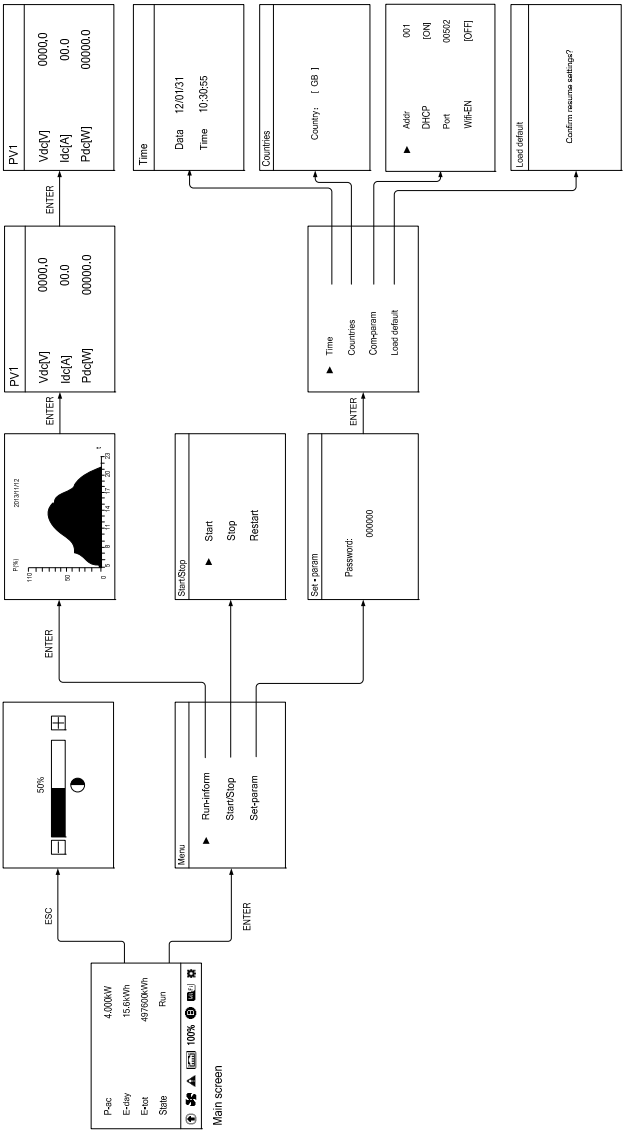


Fig. 10-1 Menu Tree-English

10.3 Main Screen

If the inverter succeeds in commissioning, LCD display will enter into the main screen, as shown in Fig. 10-2.

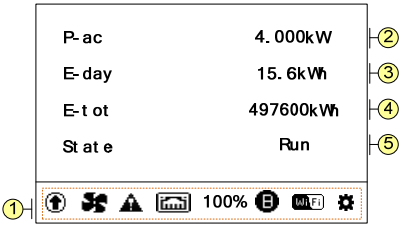


Fig. 10-2 Main Screen Description

No.	Description
1	Icons (refer to the Tab. 10-3) and the active power limits (P-W limits).
2	Current output power.
3	Energy generation during this day until now.
4	Total energy generation since initial commissioning.
5	Inverter state.

NOTICE

The energy yields displayed by the LCD panel are indicative only.

For the actual yields, please refer to the electric energy meter.

Tab. 10-2 Inverter State Description

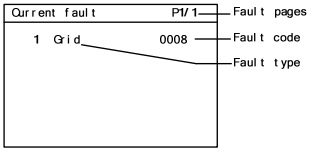
Inverter State	Description
Run	After being energized, the inverter tracks the PV arrays' maximum power point (MPP) and feeds AC power to grid. This mode is the normal mode.
Standby	In this mode the inverter will wait for sufficient sunlight and the DC voltage recovers. The PV voltage is more than 230V.
Key-stop	The inverter will stop operation by manual "stop" through LCD menu.
Ini-standby	The state when inverter is power-on for the first time. The PV voltage is less than 230V.
Startup	The inverter is initializing and synchronizing with the grid.
Com-err	Inverter internal communication failure.

Inverter State	Description
Fault	If a fault occurs, the inverter will automatically stop operation, trigger the AC relay and show "Fault" on the LCD with the "FAULT" indicator lit. Once the fault is removed in recovery time (set by user, see "**9.1.2 Troubleshooting of Faults in LCD Screen**"), the inverter will automatically resume running.
Upd-fail	The master DSP program online upgrade failure.

NOTICE

- **If the device is in standby mode for more than 10 minutes, please check if the insolation is sufficient and the PV connection is correct.**
- **If no anomaly is found, disconnect DC switch and grid switch to restart.**
- **If it still does not work, contact SUNGROW.**

If inverter is in "Fault" state, Press ➤ to view multiple "Current fault" information pages. To know the specific fault information, please refer to "**9.1.2 Troubleshooting of Faults in LCD Screen**".

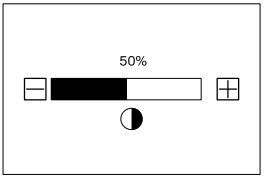


Tab. 10-3 Description of icons

Icon	Description
	DSP or LCD is in IAP update process.
	Fan inside is working.
	The Ethernet communication cable is active.
	Inverter is in warning state.
	LCD and Bank server is successfully connected.
	WiFi and Bank server is successfully connected.
	WiFi has connected to the router. Blink when connection failure.
	WiFi is waiting to be connected to the router.

The last three icons don't exist when access the APP of SolarInfo Bank in local mode.

10.4 Adjusting Contrast



1. Press **ESC** to enter into the contrast adjustment screen.
2. Press ➘ to increase the setting value and press ➤ to decrease the value.
3. Press **ENTER** to confirm the contrast setting.

The contrast value ranges from 0 to 100. The recommended value is 50 or 60.

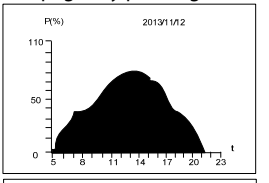
10.5 Viewing Detailed Running Information

On the main screen, there is some basic information about the inverter. For more detailed running information, please operate as follows.

Main Screen (Press ENTER) →Menu→Run-inform (Press ENTER)

LCD screen will show detailed running information. Scroll pages by pressing ➤ /➘.

Power curve during this day until now.



Vdc: DC voltage of PV1 input.
Idc: DC current of PV1 input.
Pdc: DC power of PV1 input.

PV1	
Vdc[V]	0000. 0
I dc[A]	00. 0
Pdc[W]	00000. 0

Vdc: DC voltage of PV2 input.
Idc: DC current of PV2 input.
Pdc: DC power of PV2 input.

PV2	
Vdc[V]	0000.0
Idc[A]	00.0
Pdc[W]	00000.0

Vac: Voltage of L1.
Iac: Current of L1.
Pac: AC output of L1.
F: Frequency of L1.

L1	
Vac[V]	0000.0
Iac[A]	00.0
Pac[W]	00000.0
F[Hz]	00.00

Vac: Voltage of L2.
Iac: Current of L2.
Pac: AC output of L2.
F: Frequency of L2.

L2	
Vac[V]	0000.0
Iac[A]	00.0
Pac[W]	00000.0
F[Hz]	00.00

Vac: Voltage of L3.
Iac: Current of L3.
Pac: AC output of L3.
F: Frequency of L3.

L3	
Vac[V]	0000.0
Iac[A]	00.0
Pac[W]	00000.0
F[Hz]	00.00

P-dc: Inverter input power.
Input mode: Inverter input connection mode.
P-W: Inverter output active power.
Peak-Power: Daily peak power value.

P-dc	00000W
Input mode	Indep
P-W	00000W
Peak power	0000W

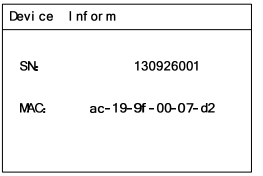
Temp: Internal temperature of the inverter.
Country: Country code selected.
Date: Current date.
Time: Current time.

Temp	000.0°C
Country	CHN
Date	13/01/31
Time	10:30

CO_2-reduce: Total CO_2 emission reduction due to the inverter.
E-month: The energy generated in this month.
h-Total: Total running hours of the inverter.
T-today: Daily running time of the inverter.

CO2-reduce	00000kg
E-month	00000kWh
h-Total	00000h
T-today	0000min

SN: Serial number.
MAC: Physical address.

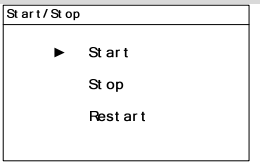


The power value indicated by each column of the histogram represents the average value of the power during the related unit interval.

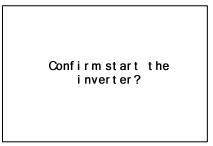
10.6 Starting and Stopping the Inverter

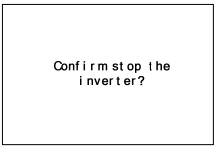
Main Screen(Press ENTER)→Menu(Press ▼×1)→Start/Stop(Press ENTER)

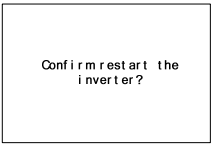
Press ▼ to choose "Start"/"Stop" and **press ENTER** to confirm the choice.



Confirm your choice by pressing **ENTER**.







The Restart item will appear only if an unrecoverable fault occurs.

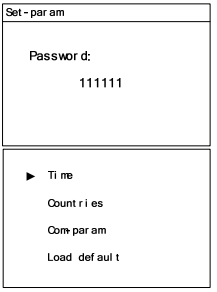
10.7 Inputting Password

The parameter settings are protected by the password. If you want to set the inverter's parameters, you have to input the correct password.

1. **Press ENTER** to enter into "Menu" screen.
2. **Press** ▼ to move the cursor to "Set-param" menu item and confirm by **pressing ENTER**.

3. A password confirmation screen will occur. **Press** ➤ to move cursor right and **Press** ➘ to input the password **111111**.

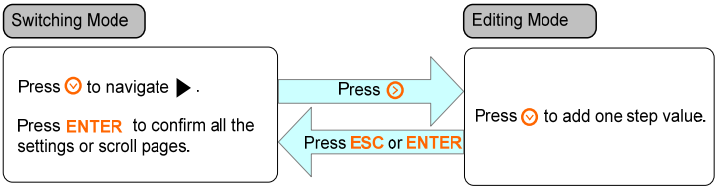
4. **Press ENTER** to confirm the password and enter the "Set-param" submenu.



10.8 Button Operation for Parameters Setting

The button functions for parameter setting in submenus may differ from that in other menus.

Proceed as follows to perform the parameter settings.


Switching Mode
Editing Mode
Press ⌄ to navigate ▶.
Press ENTER to confirm all the settings or scroll pages.
Press ›
Press ESC or ENTER
Press ⌄ to add one step value.

10.9 Setting the System Parameters

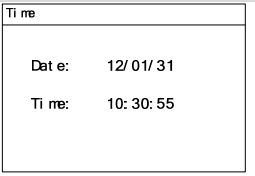
10.9.1 Setting the Time

If there is deviation between the time on inverter main screen and your local time, you should perform the operation time setting. Otherwise the inverter data logging will fail. Clock is 24-hour format.

The date format is **YY/MM/DD**. **YY, MM**, and **DD** stand for year, month, and day respectively. The time format is **hh/mm/ss**. **hh**, **mm**, and **ss** stand for hour, minute, and second respectively.

Main Screen(Press ENTER)→Menu screen(Press ▼×2)→Set-param(Press ENTER)→Enter password(Press ENTER)→Time(Press ENTER)

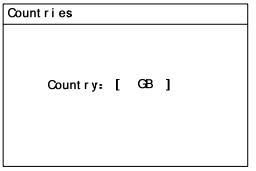
On the "Time" screen, **Press** ➤ to move the cursor right and **Press** ▼ to set the correct date and time. Confirm settings by **pressing ENTER**.



10.9.2 Selecting the Country Code

Main Screen(**Press ENTER**)→Menu screen(**Press** ▼×2)→Set-param(**Press ENTER**)→Enter password (**Press ENTER**) → Sys-param(**Press ENTER**, Press ▼×1) → Countries(**Press ENTER**)

To make protective parameters setting convenient, inverter provides country code selection. The country code has been configured before delivery according to different countries utility grid requirements. Choose the correct country code by Press ▼ and Press **ENTER** to confirm.



The description of country code is illustrated below:

Country Code	Full Name	Language
GB	Great Britain	English
DE	Germany	German
FR	France	French
IT	Italy	Italian
ES	Spain	English
AT	Austria	German
AU	Australia	English
CZ	Czech	English
BE	Belgium	French
DK	Denmark	English
GR_L	Greece Land	English
GR_IS	Greece Island	English
NL	Netherlands	English
PT	Portugal	English
CHN	China	Chinese
SE	Sweden	English
VB(DE)	Vorarlberg	German
Other	Country not included above	English

10.9.3 Setting Communication Parameters

Main Screen(Press ENTER)→Menu screen(Press ▼×2)→Set-param(Press ENTER)→Enter password(Press ENTER)→Sys-param(Press ENTER, Press ▼×2)→Com-param (Press ENTER)

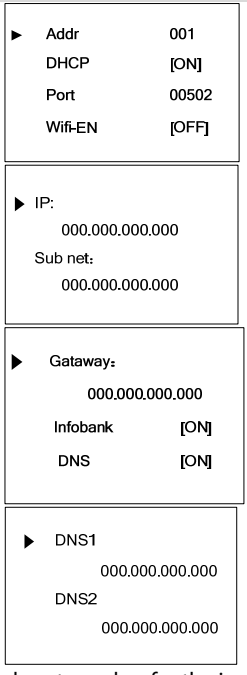
Press ➤ to move cursor right and **Press ▼** to set the appropriate value. Confirm settings by Pressing **ENTER**.

The range of communication address is 1...247.

WiFi-EN ON: WiFi function enabled

WiFi-EN OFF: WiFi function disabled

Scroll pages by pressing **ENTER**



Apply an IP address, subnet mask, default gateway and port number for the inverter from your network administrator.

NOTICE

If there is more than one inverter and all the inverters are set to DHCP [OFF], a unique IP address should be assigned to each inverter. The configuration procedure should be performed only by qualified personnel.

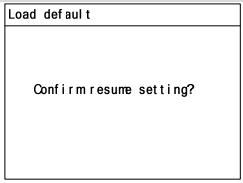
10.9.4 Load Default

NOTICE

All history information will be unrecoverable cleared and all parameters will return to the default value except the protective parameters and time once the "load default" operation is performed.

Main Screen(Press ENTER)→Menu screen(Press ▼×2)→Set-param(Press ENTER)→Enter password(Press ENTER)→Sys-param(Press ENTER, Press ▼×3)→Com-param (Press ENTER)

Press **ENTER** to confirm "load default".



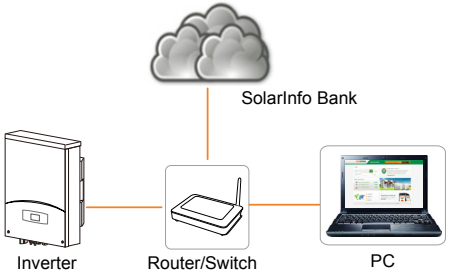
11 Viewing PV Plant Information

After registering on the webpage www.solarinfobank.com, user can view PV plant information through the PC or smartphone. User can also view PV plant information through the APP of SolarInfo Bank installed into the smartphone.

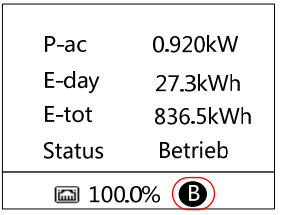
11.1 For Common User

11.1.1 SolarInfo Bank Connection

1. Connect the communication cable between router and inverter, and connect the communication cable between router and PC.



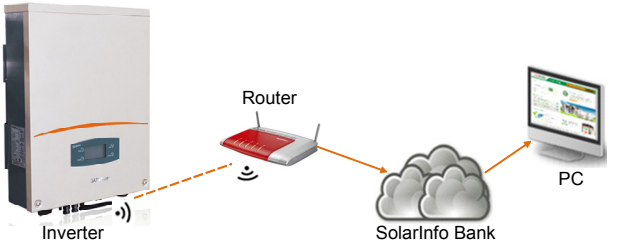
2. Wait for about 10 minutes and the icon as shown in the figure below will appear on the main LCD display screen. The SolarInfo Bank connects to the inverter successfully.



3. Open the explorer, input the webpage www.solarinfobank.com in the address bar. Register and then visit SolarInfo Bank. For details, see "**11.3 Registration and Adding PV Plant**".

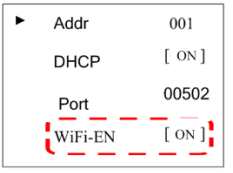
11.1.2 SolarInfo WiFi Connection

The WiFi antenna can increase the transmission distance and strength of WiFi signal. Bind the WiFi to a router. When the router can access the Internet, the running information of inverter can be uploaded to SolarInfo Bank server through the router. Register and add PV plant on the webpage www.solarinfobank.com. Then you can inquire the running information of the corresponding inverter.

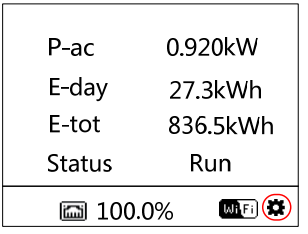


Take iPhone 4 and Netgear router for example in the following configuration.

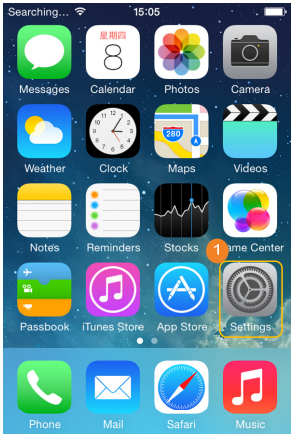
1. Set the WiFi-EN to ON through the inverter LCD display screen. For details, see "**10.9.3 Setting Communication Parameters** ".



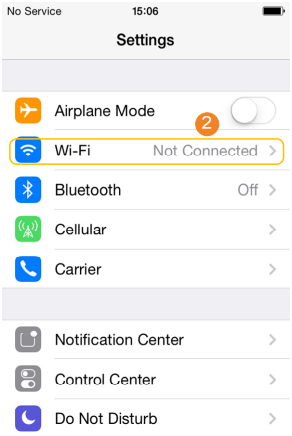
2. The setting icon shown in the figure below will appear on the main LCD display screen. Then you can start to configure parameters.



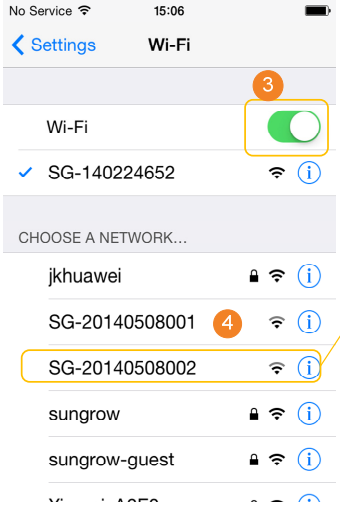
3. Enable the WiFi function of smartphone and choose the device named "SG-XXXXXXXX" in network list (XXXXXXXX represents the serial number of inverter). The serial number is the S/N information marked on the nameplate. The following figure takes inverter 20140508002 for example.

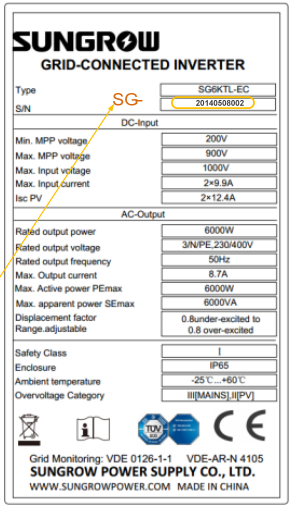


Click Setting



Choose Wi-Fi





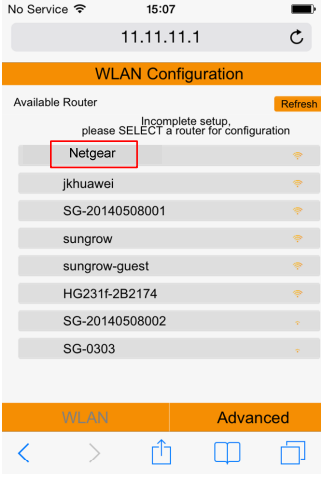
Select corresponding device according to the SN.

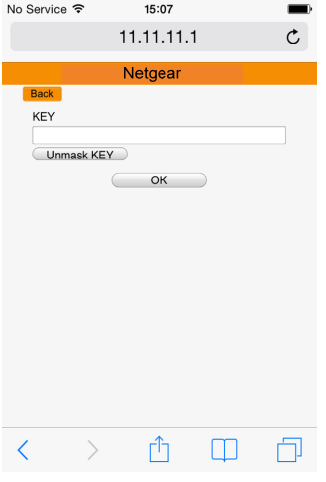
4. Open the browser, input "11.11.11.1" into the address bar and press Enter. Routers around will be listed.

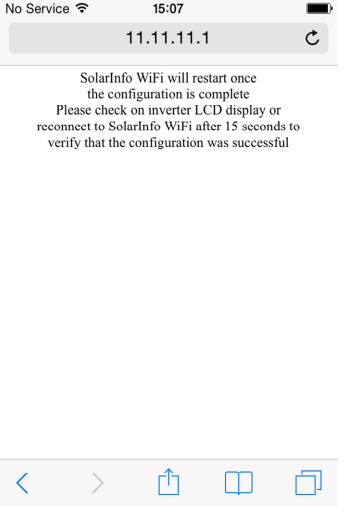
NOTICE

The router name cannot be longer than 31 characters.

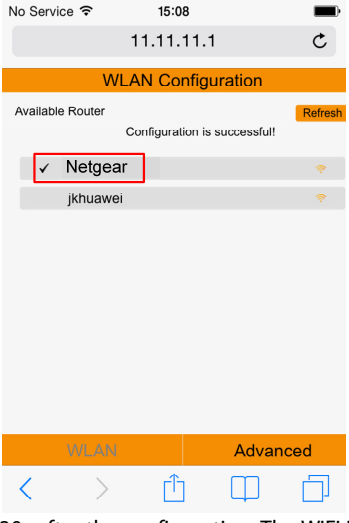
5. Choose the Netgear router and input the router-visiting password. Then click OK. SolarInfo WiFi will restart once the configuration is completed, as shown in the following figures.



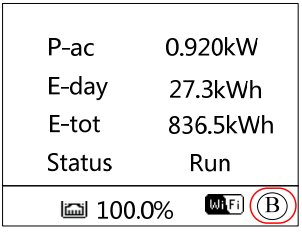



No Service
15:07
11.11.11.1
SolarInfo WiFi will restart once
the configuration is complete
Please check on inverter LCD display or
reconneet to SolarInfo WiFi after 15 seconds to
verify that the configuration was successful

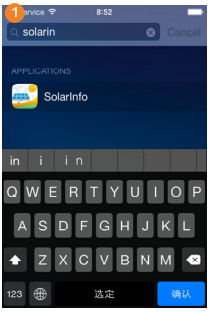
6. 10s after the configuration is finished, perform Step 2 and Step 3 again to make sure the configuration is succeeded. The following figure shows that the router Netgear is successfully connected. Repeat the steps above if the configuration is not succeeded.



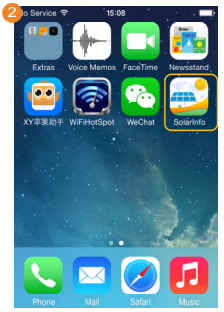
7. Wait for longest 30s after the configuration. The WiFi icon will stop blinking if the configuration is successful. Otherwise it will always blink and you should reconfigure the parameters.
8. If the router can visit the Internet, the setting icon will change to B icon, as shown in the figure below. The SolarInfo Bank is connected successful and the device information can be uploaded to it.



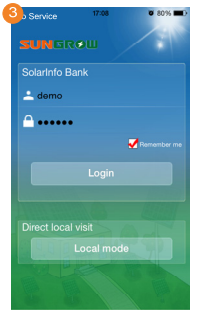
9. Search for SolarInfo Bank, download and install the APP into your smartphone. Open the APP and log in, and then you can view the plant information through the APP of SolarInfo Bank.



Search for SolarInfo Bank and install



Open SolarInfo Bank



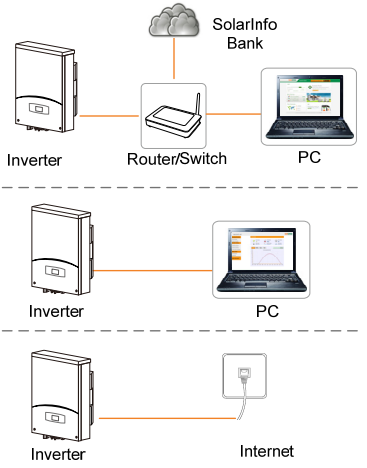
Input name and password to login

11.2 For Professional User

11.2.1 SolarInfo Bank Connection

The following table shows the three scenarios of connection for professional user.

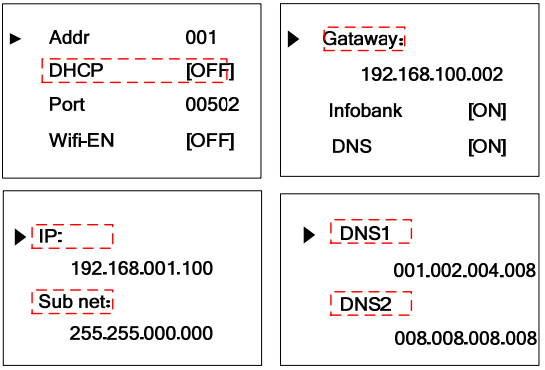
No.	Description
Scenario 1	The inverter is connected to router, and the router is connected to the PC. The router cannot allocate IP address automatically.
Scenario 2	The inverter is connected directly to PC.
Scenario 3	The inverter is connected directly to the net port.



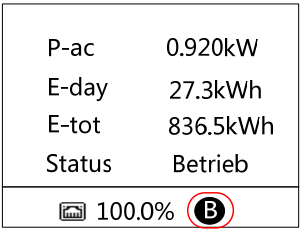
1. Connect the communication cable.
2. Set the DHCP to OFF and set the IP address, subnet mask, gateway, DNS1 and DNS2, as shown in the following figure.

NOTICE

Acquire the IP, subnet mask, gateway, DNS1 and DNS2 from the network professional.



3. Wait for about 10 minutes and the icon as shown in the figure below will appear on the main LCD display interface. The SolarInfo Bank connects to the inverter successfully.



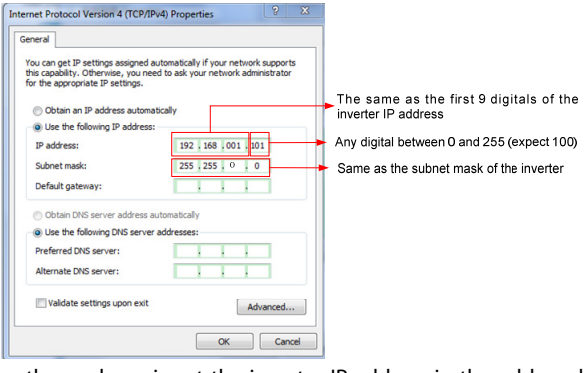
4. **(Optional)** Do this step only for scenario 2. Proceed as follows to configure the IP address and subnet mask of the computer.
   - For Windows 7 or higher version, right click the [Network and Internet] icon on the right corner of the desktop, click [Network and Sharing Center], open [Local Area Connection], click [Properties], double click [Internet Protocol Version 4 (TCP/IPv4)], click [Use the following IP address].
   - For Windows XP, right click [My Network Places], open [Local Area Connection], click [Properties], and double click [Internet Protocol (TCP/IP), and then click [Use the following IP address].

IP address format:

- First 9 digitals of the IP address: the same as the first 9 digitals of the inverter IP address. Example: if the inverter IP address is 192.168.001.100, you must input 192.168.001 for the first 9 digitals of computer IP address.
- Last 3 digitals of the IP address: any digital between 0 and 255 (expect for the last 3 digitals of the inverter IP address), for example 101.
- So the IP address is 192.168.001.101.

Subnet mask of the computer:

- Must be the same as that of the inverter, i.e. 255.255.000.000.


Internet Protocol Version 4 (TCP/IPv4) Properties
General
You can get IP settings assigned automatically if your network supports this capability. Otherwise, you need to ask your network administrator for the appropriate IP settings.
Obtain an IP address automatically
Use the following IP address:
IP address:
192 . 168 . 001 . 101
Subnet mask:
255 . 255 . 0 . 0
Default gateway:
Obtain DNS server address automatically
Use the following DNS server addresses:
Preferred DNS server:
Alternate DNS server:
Validate settings upon exit
Advanced...
OK
Cancel
The same as the first 9 digitals of the inverter IP address
Any digital between 0 and 255 (expect 100)
Same as the subnet mask of the inverter

5. Open the explorer, input the inverter IP address in the address bar to enter the WebServer login interface. Input the user name and password which are **user** and **1111** respectively by default, and then press ENTER. WebServer is connected successfully.
6. Open the explorer, input the webpage www.solarinfobank.com in the address bar. Register and then visit SolarInfo Bank. For details, see 11.3

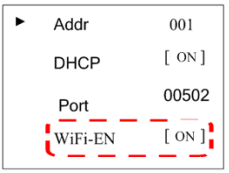
Registration and Adding PV Plant.

- In scenario 1 and scenario 3, the computer can visit SolarInfo Bank only when the router can access to Internet.
- In scenario 2, the computer cannot visit SolarInfo Bank.
- For scenario 3, contact service engineer of SUNGROW when the inverter and the PC are in different subnets.

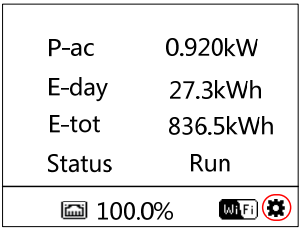
11.2.2 SolarInfo WiFi Connection

Take iPhone 4 and Netgear router for example in the following configuration.

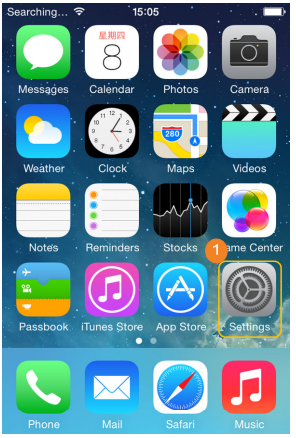
1. Set the WiFi-EN to ON through the inverter LCD display. For details, see "**10.9.3 Setting Communication Parameters** ".



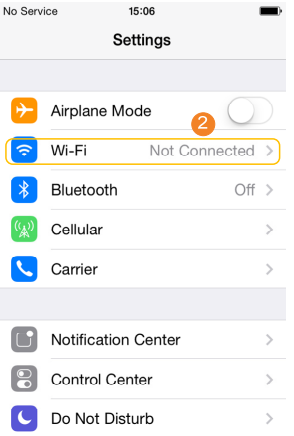
2. The setting icon shown in the figure below will appear on the main LCD display screen. Then you can start to configure parameters.



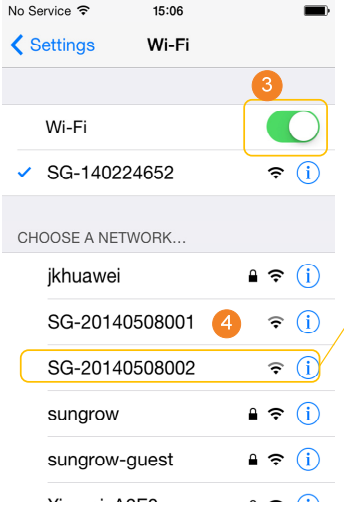
3. Enable the WiFi function of smartphone and choose the device named "SG-XXXXXXXX" in network list (XXXXXXXX represents the serial number of inverter). The serial number is the S/N information marked on the nameplate. The following figure takes inverter 20140508002 for example.

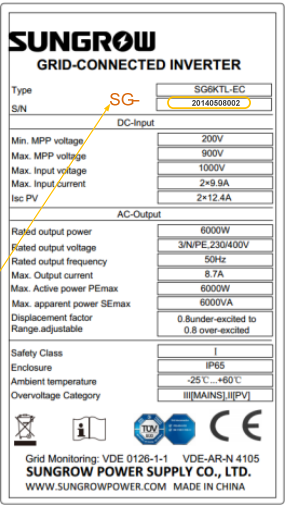


Click Setting



Choose Wi-Fi





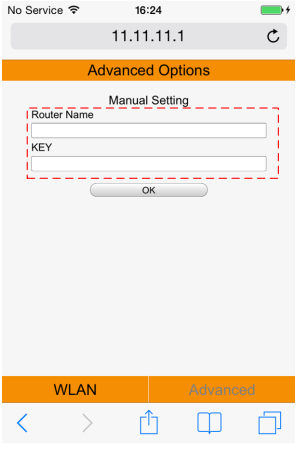
Select corresponding device according to the SN.

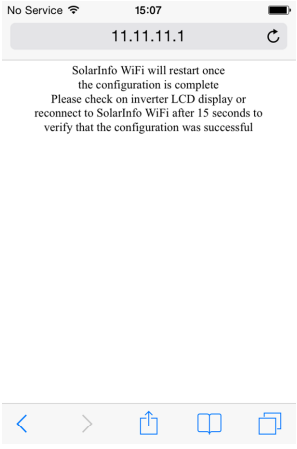
4. Open the browser, input "11.11.11.1" into the address bar and press Enter. Routers around will be listed.

NOTICE

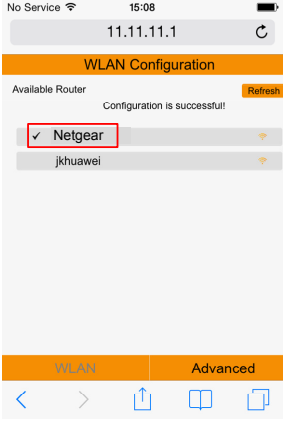
The router name cannot be longer than 31 characters.

5. If the Netgear router does not appear in the list after refreshing three times, maybe anomaly occur. Click **Advanced** to enter the **Advanced Options** interface. Input the router name and visiting password manually. Click OK for connection, and the SolarInfo WiFi will restart once the configuration is completed, as shown in the following figures.

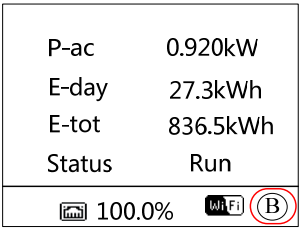



No Service
15:07
11.11.11.1
SolarInfo WiFi will restart once
the configuration is complete
Please check on inverter LCD display or
reconnect to SolarInfo WiFi after 15 seconds to
verify that the configuration was successful

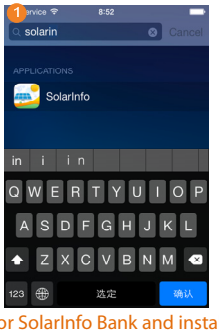
6. 10s after the configuration is finished, perform Step 2 and Step 3 again to make sure the configuration is succeeded. The following figure shows that the router Netgear is successfully connected. Repeat the steps above if the configuration is not succeeded.



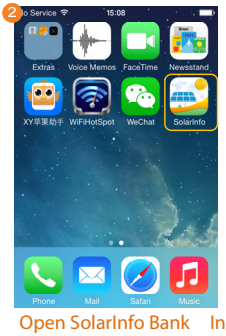
7. Wait for longest 30s after the configuration. The WiFi icon will stop blinking if the configuration is successful. Otherwise it will always blink and you should reconfigure the parameters.
8. If the router can visit the Internet, the setting icon will change to B icon, as shown in the figure below. The SolarInfo Bank is connected successful and the device information can be uploaded to it.



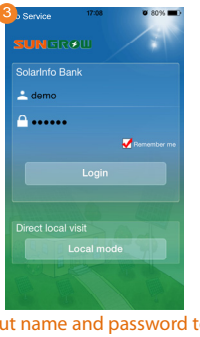
9. Search for SolarInfo Bank, download and install the APP into your smartphone. Open the APP and log in, and then you can view the plant information through the APP of SolarInfo Bank.



Search for SolarInfo Bank and install



Open SolarInfo Bank

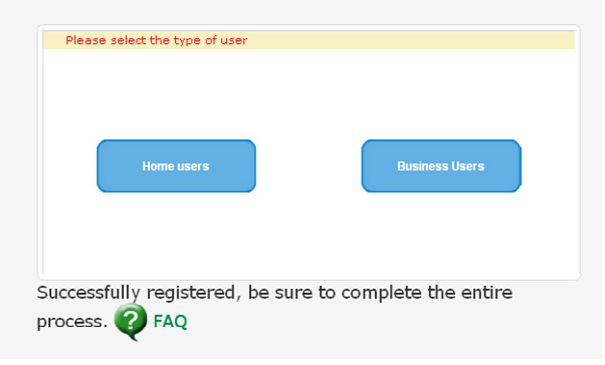


Input name and password to login

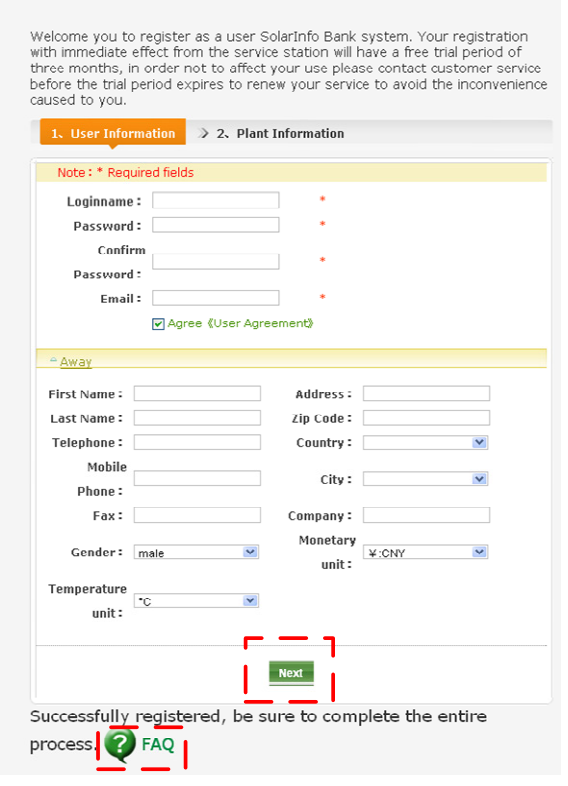
11.3 Registration and Adding PV Plant

1. Open a browser and enter the webpage www.solarinfobank.com to view the homepage of SolarInfo Bank. Register a new user by clicking "Register".

2. The registration interface as shown below will appear .User can select Home user or Business user according to real situation. Select Home user for residential use. Select Business user for commercial use.

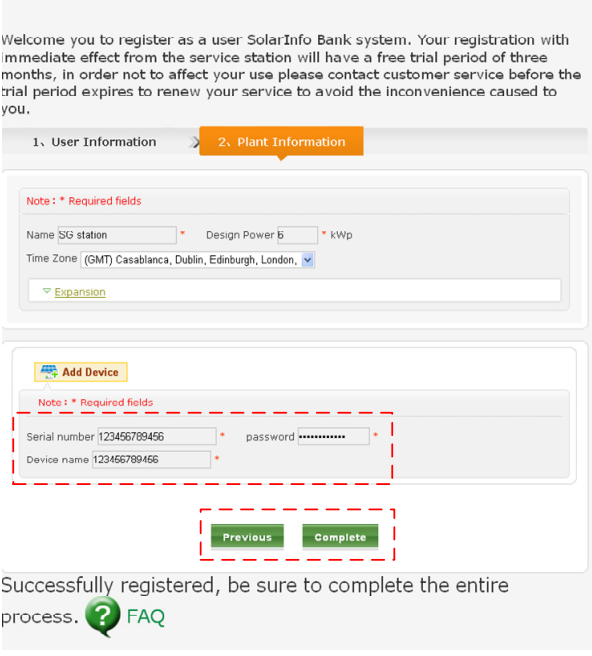

Please select the type of user
Home users
Business Users
Successfully registered, be sure to complete the entire process.
FAQ

3. Fill in user information as shown in the following figure and click Next.

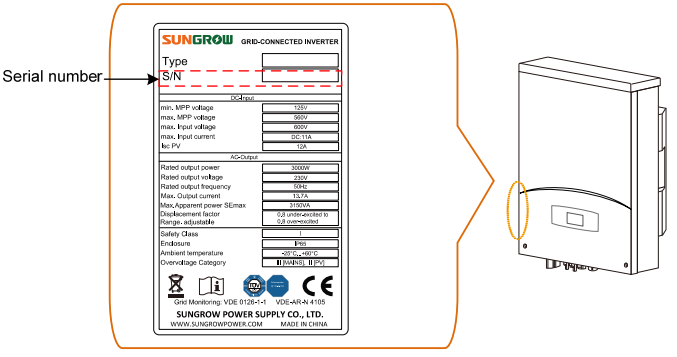

Welcome you to register as a user SolarInfo Bank system. Your registration with immediate effect from the service station will have a free trial period of three months, in order not to affect your use please contact customer service before the trial period expires to renew your service to avoid the inconvenience caused to you.
1、User Information
2、Plant Information
Note : * Required fields
Loginname :
Password :
Confirm Password :
Email :
Agree《User Agreement》
Away
First Name :
Last Name :
Telephone :
Mobile Phone :
Fax :
Gender :
male
Temperature unit :
°C
Address :
Zip Code :
Country :
City :
Company :
Monetary unit :
¥:CNY
Next
Successfully registered, be sure to complete the entire process.
FAQ

The Country, City, Monetary unit and Temperature unit can be selected from the drop-down list. For other items, user must fill in manually.

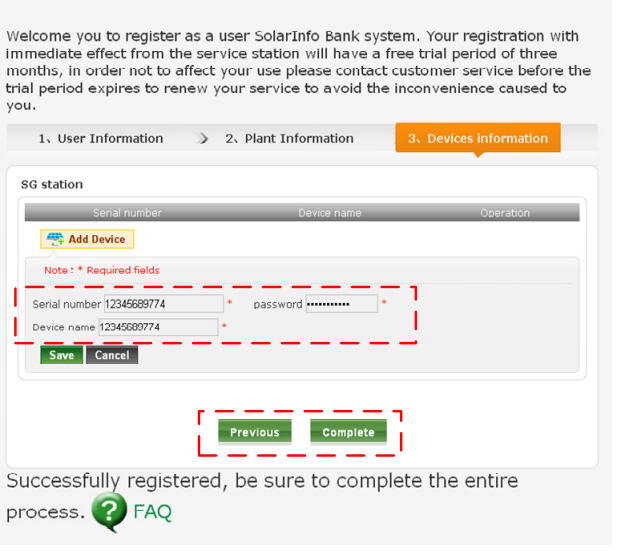
4. Enter the Plant Information interface. Click Complete to finish the registration and click Previous to return to the precious page to modify information. If the Home users is selected in step 2, the registration process is finished by now.


Welcome you to register as a user SolarInfo Bank system. Your registration with immediate effect from the service station will have a free trial period of three months, in order not to affect your use please contact customer service before the trial period expires to renew your service to avoid the inconvenience caused to you.
1、User Information
2、Plant Information
Note：* Required fields
Name SG station
Design Power 6
kWp
Time Zone (GMT) Casablanca, Dublin, Edinburgh, London,
Expansion
Add Device
Note：* Required fields
Serial number 123456789456
password
Device name 123456789456
Previous
Complete
Successfully registered, be sure to complete the entire process.
FAQ

- Time Zone must be selected according to the installation place of the inverter. If user does not know the local time zone, please check in Google map.
- If new devices are added, please fill in the related information in the following format:
  - **Serial number**: the serial number shown on the device nameplate.
  - **Password**: the same as the serial number and should be input manually.
  - **Device name**: the same as the device serial number by default and can be changed by the user.



5. Proceed as follows to fill in the Devices Information if the Business users is selected in step 2.


Welcome you to register as a user SolarInfo Bank system. Your registration with immediate effect from the service station will have a free trial period of three months, in order not to affect your use please contact customer service before the trial period expires to renew your service to avoid the inconvenience caused to you.
1、User Information
2、Plant Information
3、Devices information
SG station
Serial number
Device name
Operation
Add Device
Note：* Required fields
Serial number 12345689774
password
Device name 12345689774
Save
Cancel
Previous
Complete
Successfully registered, be sure to complete the entire process.
FAQ

NOTICE

The format of Serial number, Password, and Device name are the same as that in Step 4. Click Complete to finish the registration and click Previous to return to the precious page to modify information.

6. Refreash the webpage www.solarinfobank.com, then you can see the data of the corresponding PV plant.

12 Appendix

12.1 Technical Data

Parameters	SG3KTL-EC	SG4KTL-EC	SG5KTL-EC	SG6KTL-EC
Input Side Data				
Max. PV input power	3191 W	4255 W	5265 W	6312 W
Max. PV input voltage	1000 V		1000 V	
Startup voltage	200 V		250 V	
Nominal input voltage	610 V		610 V	
MPP voltage range	140...900 V		200...900 V	
MPP voltage range for nominal power	160...800 V	210...800 V	280...800 V	320...800 V
No. of MPPTs	2			
Max. number of PV strings per MPPT (DC1/DC2)	1/1			
Max. PV input current (DC1/DC2)	19.8 A(9.9 A/9.9 A)			
Max. current for input connector	12 A			
Short-circuit current of PV input (DC1/DC2)	24.8 A(12.4 A/12.4 A)			
Output Side Data				
Nominal AC output power	3000 W	4000 W	5000 W	6000 W
Max. AC output apparent power	3000 VA	4000 VA	5000 VA	6000 VA
Max. AC output current	4.4 A	5.8 A	7.3 A	8.7 A
Nominal AC voltage	3/N/PE, 230/400 Vac			
AC voltage range	310…480 Vac (May vary as per corresponding country's grid standard)			
Nominal grid frequency	50 Hz			
Grid frequency range	45…55 Hz (May vary as per corresponding country's grid standard)			
THD	< 3% (Nominal power)			
DC current injection	<0.5% In			
Power factor	>0.99 @default value at nominal power, (adj. 0.8 overexcited to 0.8 underexcited)			

Parameters	SG3KTL-EC	SG4KTL-EC	SG5KTL-EC	SG6KTL-EC
Protection				
Anti-islanding protection	Yes			
DC reverse connection protection	Yes			
AC short circuit protection	Yes			
Leakage current protection	Yes			
DC switch	Integrated			
DC fuse	No			
Overvoltage protection	III			
System				
Max. efficiency	98.0%	98.1%	98.1%	98.1%
Max. European efficiency	96.2%	96.8%	97.2%	97.3%
Isolation method	Transformerless			
Ingress protection rating	IP65			
Night power consumption	<1 W			
Operating ambient temperature range	-25℃...60℃(> 45℃ derating)			
Allowable relative humidity range	0...95%, non-condensing			
Cooling method	Natural cooling			
Noise	≤29 dB			
Max. operating altitude	2000 m			
Display	Graphic LCD			
Communication	Ethernet, RS485(RJ45 connector),4×Digital Inputs, WiFi, Webserver Integrated			
DC connection type	MC4			
AC connection type	Plug and play connector			
Certification	VDE0126-1-1			
	EN62109-1,EN62109-2			
	G83/1			
	VDE-AR-N-4105			
Mechanical Data				
Dimensions (W×H×D)	403 mm×518 mm×190 mm			
Mounting method	Wall bracket			
Weight	22 kg			

12.2 Exclusion of Liability

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- Installing or operating the product in an unintended environment
- Ignoring relevant safety regulations in the deployment location when installing or operating the product
- Ignoring safety warnings and instructions contained in all documents relevant to the product
- Installing or operating the product under incorrect safety or protection conditions
- Altering the product or supplied software without authority
- The product faults due to operating attached or neighboring devices beyond allowed limit values
- Damages caused by irresistible natural environment

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- Decompiling, decoding or destroying the original program, including SolarInfo software and the embedded software, is prohibited.

12.3 About Us

SUNGROW power supply is a China-leading manufacturer of various power electronics products for renewable energy generation systems. Our products include converters, inverters, battery chargers and other power supplies for

distributable generation system in both grid-connected and stand-alone applications. The power rating of SUNGROW products covers from hundred watt to mega-watt systems.

The vision of SUNGROW is to help our customers acquire stable and clean power with minimum cost, maximum reliability and enhanced safety.

Contact Information

Should you have any problems about this product, please contact us through the following information. We will be more than happy to assist you!

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